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## FINANCIAL STATEMENTS UNDER THE ECONOMY GLOBALIZATION CONDITIONS: CONDITIONS AND PERSPECTIVES OF THE DEVELOPMENT

**Abstract.** The key issues are described of the current information field of the public financial statements of modern corporate companies in the context of its functions with regard to the information insurance of different users under the conditions of the global post-industrial economy. The assessment was conducted of the methodological aspects of accounting of separate objects of the modern corporations' public accounting. The key aspects are provided of the negative impact of the restricted information of the financial statements of transnational and socially important national companies and the processes of management and regulation of the national and global economy.

The suggested perspectives are analyzed in the theory and world business practice of the development of conceptual grounds for the solution of problem of the adaptation of the format of public statements system of the corporations to the modern economic conditions and informational needs of different groups of users, including the market institutional formations. The need was accentuated of the improvement of accounting approach and principles of presentation of the value of modern corporations' capital. Certain aspects of the development of current basic financial statements fundamentals are justified and suggested.

**Key words:** financial statements, system of indexes, theories, paradigms, adaptation, cost criteria.

### Introduction

Under the conditions of modern globalised economic area any business entity, regardless of its belonging to the specified national economy,

functions within the established world financial and economic architecture, complying with the elaborated principles of business, standards of the information and communication technologies. In this context the special meaning is given to the information provided in the public statements by the market economy subjects which develops the efficiency of their functioning, development potential, investment attractiveness, business solvency etc. This information is used essentially by the different institutions – state organs of planning, predicting and regulating of the economic processes within certain national economy, institutional formations at the global markets of capital and investments. Quality, relevance and completeness of the information of public financial statements are, first of all, related to the transformational and national socially meaningful companies. Regardless of the importance of the objectiveness and completeness of financial statements indexes, modern rules and principles of its formation are considered incompliant with the real practice of business and the ones which affect the processes of the global economy regulation. In particular, it is assumed that “modern periodical critical phenomena observed in the process of the development of world economy and separate business entities is the

reason and consequence of the information system which, for different reasons, does not provide the stakeholders with the useful and transparent information” [1, p.94]. Therefore, the genesis of functions and conceptions of the public financial statements under the conditions of the post-industrial society requires further investigation.

### **Problem settlement**

The transparency and disclosure of the objective and unbiased information about the effectiveness of the functioning, financial and economic condition and development potential is the basis of the corporate management in the modern global economy. The users' requirements are determinant with regard to the information quality characteristics, as to insure the needs of the external users the statement is formed which should have the characteristics of quality, complex characteristics of which is the key attribute of the public financial statements of the corporations. However, “the use of the traditional financial statements package as a resource of information under modern conditions of the world economy is not enough” [2, p.17].

In the scholarly researches of purely topical direction with regard to the development and adaptation of the financial statements to the modern business conditions the “the complex scholarly researches are absent which could tackle the most important issues in the sphere of the accounting statements and would determine the key tendencies of its further development with regard to the transformation of economic conditions of the companies functioning, change of the management approaches, wide application of the information and computer systems and technologies” [3, p.5]. Analysis of the accounting or balance theories which constituted the theoretical grounds of the accounting science development till the beginning of XX cent. (for instance, V.P. Filios [4], gives the reasons to claim the necessity of the development of modern theories of the accounting which would allow explaining the reasons and ground the introduction of the new types of the statements into the accounting practice of modern companies under the globalization conditions and economy post-

industrialization. One of the approaches of the assessment of the statements modern paradigm compliance is the specification of the restrictions hindering its further development. The detailed list of such restrictions was determined by the representatives of the **Institute** of Chartered Accountants in England and Wales based on the analysis of 11 new statement patterns based on which a new approach was suggested to the details and procedural aspects of functioning of the account reports system [5, p.15].

The general issues settlement is about the “theorization of the issues of formation, compilation and publication of the statements for the purpose of searching the possibilities of building the predictions of its further development which will facilitate the improvement of the adaptation of the company accounting systems to the functioning under the new socio-economic conditions” [3, p.10].

**Analysis of the last researches and publications** testifies to the existing acute problems as to the objectiveness of the information provided in the public financial statement of transnational and socially important corporations, in particular, about the value of assets and capital available. The problematic is first of all related to the type of financial instruments – assets of the virtual economy, specific (virtual) nature of which requires the application of other approaches to their acknowledgement and assessment than the traditional cost-based pattern. Generally characterizing the problematic nature of information in the public statements of modern corporations, Ya. V. Sokolov said: “main task of its adaptation to the modern economic conditions is reduced to the fact that the actual owners (current owners) and especially potential (possible) owners of the shares and other securities have a real idea about the assets of companies which they either want to sell (actual owners) or consider possible to buy (potential owners)” [6].

The elaboration of the new principal approaches and methodological foundations of the public financial statements of the corporate companies is considered by the scholars also in

wider spectrum than the relations between the corporations and its shareholders. Thus, for instance, V.M. Zhuk justifiably proves the importance of the information of public financial statements of the corporations (for instance, the transnational) on the regulation of the global economic processes: “important grounds of “virtual bubbles” threatening the world economy are the marginal predictions and expectations which could be balanced by the financial statements” [7]. A group of authors of the monograph [8] comes to the conclusion that the “economic transformations under the influence of market mechanism require the new guides in the formation of the financial information transparency level adequate to the global environment” [8, p.193].

Generally, the theoreticians and practitioners acknowledge that the formulation of the new format of institutional environment of correcting the essence of the formal and informal institutions need the essential adaptation to these modifications of the financial statements as an important component of information and analytical instrumentation of management and regulation of the financial and economic processes. The orientation of such adaptation is considered by scholars in different perspectives, in particular, L.M. Pylypenko considers the “key demands to the change of conceptually-methodological foundations of accounting system the approach of the balance statement of the market economy subject to its market value, insurance of the possibility of assessing the efficiency of its functioning according to the created value criterion” [9, p.24].

Such mainstream of the adaptation of modern format of financial statements to the needs of the inter-corporation management, capital markets and investments is dominating. Thus, for instance M.V. Koriahin grounds that “reflection of the indexes of value in the financial statements turns it into the important information resource for the analysis of internal capital management mechanisms, assessment of the efficiency of the use of the invested resources, determination of the level of received added value on the invested capital which constitutes the key interest for the company shareholders and its

potential investors” [2, p.266]. Formation of the post-industrial economy conditions-adaptive public accounting of the transnational and socially important national corporations is considered by the scholars also through the possibility of the development of existing principles and approaches to making the financial statements, in particular, in the complementing of its traditional forms by the additional indexes of the financial and non-financial nature about the factors influencing the informational disclosure of the business value. Therefore, according to T. Kurchenko, “new philosophy of assessing the results of the modern companies activity is aimed at the integration of the financial and non-financial indexes which also characterize their social and ecological policy, and rendering the information as to all the resources facilitating the receipt of the economic benefits” [1, p.103].

Despite the theoretical grounding by the scholars of different format and configuration of such type of indexes, the methodological range as to their affirmation has not been developed till this day even in the theory. For such purposes it is suggested to use the accounting normalization and transformation methods. However, the first one does not provide for the considering of separate generating assets which may have an essential impact upon the cash flow formation and market value of the company, and the second one which provides for the data correction for bringing the accounting information to the unified standards, contains some uncertainty – declassification of the statement items and making the corrections therein is a possible way of bringing the statements to the requirements of IFRS / USGAAP / IAS, but commonly accepted standard of the company accounting transfer for the reflection of its monetary condition at the capital and investments market was not elaborated.

**The unsolved part of the general problem** is connected with the insufficient ability of modern accounting system standardized according to any version to fully satisfy the informational requests of different groups of users, in particular, the unsolved remain the issues of both the public

accounting and the format of presenting this type of informational product.

**The article objective** is the research of compliance of the financial statement indexes of modern socially important companies with the informational request of users, determination of the reasons of their incompliance in the context of declared functions of public accounting within the global economy, conducting the assessment of conceptions suggested in modern theory of its adaptation to the conditions of real economy and on this basis formulate the arguments as to the viable perspectives of the financial statements theory development.

#### **Statement of basic material**

The meaning of the indexes of public accounting of modern subjects of the market economy in the management of global financial and economic processes, regulation and prediction of the development of the world and national economies, as well as for the purposes of the inter-corporation management, is generally accepted. Widely accepted is also the fact that modern principles of construction and standardized rules of the informational formation in the financial statements do not fully satisfy the demands of the interested users and are not able to objectively describe the financial condition of the economic subject, nor the potential of its development, i.e. represent the actual picture of the investment attractiveness of the modern companies.

Considering the above in the world economic practice and, correspondingly, in the scholarly elaborations the numerous directions and conceptions are suggested of the development of existing theory of financial statements; in the scholarly literature and analytical reviews the analysis of its new types and formats is provided of the representation in the practical activity of certain companies. However, according to the prof. K. Napier, even till this day, there is no unified opinion in the manuals leading for the world accounting community as well as there is no unified opinion as to what the theory of financial statements actually is [10, p. 94].

Absence of the formulated concept of the new format of public accounting adequate for the needs of modern economy is substituted by the use of different type by the systems of actual accounting which, as it is considered, is able to transform the traditional accounting indexes into the cost criteria. Such types of accounting are maintained with the application of the double record method and through certain methods of processing the accounting indexes provide the information about the change of the company market value. In practice, in most cases the accounting services do not keep such accounting and transfer it for reading by the exchanges or assessment specialists. It is understandable that this way different methods are used which loses the element of the comparability of public financial statements indexes of different corporations.

Scholars stick to the approach according to which in the wide sense the accounting report theories strive to provide for the grounds for the application of principles or general notions which will allow disregarding the practice of formation and compilation of the financial statements. Such structure is aimed at the insurance of the consecutive and systematic development of practice, its improvement, understanding, explanation and prediction. The formation of the “conceptual structure may take place inside the accounting or based on using the knowledge of the scholarly domains, such as economy, theories of information, psychology, political theory or law” [10,p.93]. Conceptually suggested elaborations are aimed at the development of the objective theories focusing on the most important, on the researcher’s opinion, object of accounting and reporting (for instance, capital of the modern companies) or elaboration of the methodological theories improving one of the accounting method elements (for instance, assessment) and peculiarities of its relative application or its separate object of accounting and reporting.

In the conceptual basis the accounting standards (SFAC1 “Financial statements objectives for the commercial companies” two top user types were determined – investors and borrowers” [11, p.11]. Besides, the authors of the international



In this model dependence of market constituent of enterprise capital from assessment of its potential capacity market mechanism is monitored (1,2,3). At the initial public offering, next emissions, in different periods of time the index of boundless constituent of capital changes and on the isometric sum non-material economic resource of enterprise (10) in part of common define and internal corporate goodwill. Interdependence of maximum limit of non-material constituent from the “real” size of enterprises assets was marked by pointer 4 (fair value of the business property).

Pointer 5, which connects the existing enterprise requirements (account receivable) with the creation of appropriate capital reserves as anticipation (expectation of non-payments crisis in conditions of economy stagnant), that should prevent the problems of managing a floating capital.

Capital reserves (pointer 6) should provide abnormal supplies of material values and prepared products, deferred expenses and also to insure doubtful and hopeless account receivable. Such reserves are expedient, in addition, to balance with the size of deferred income, part of which also does not have the proper legal and financial provision (pointer 7). Such revenues in previous periods were included in the calculation of indexes, including indexes that characterize the cost of enterprise. It is suggested (pointer 11) to counterbalance equity with purchased goodwill in consolidation. The offered scheme foresees redemption of fictitious assets that arise up at the fact of purchasing goodwill (extrapolation of results is the overpriced expectations) in a modern economy by reducing the risk of equity losses.

Profit, as an additional cost of invested capital should reflect its direct dependency with the size of market value of this capital (conception of preservation the financial capital) and that is why it must be determined on such basis and meddle with the size of equity in the end of reporting period (pointer 8).

The legislative adjusting of creation the reserve capital should have stricter regulations. Reserve capital that is created according to legislative regulations due to profit, in unprofitable enterprises is absent. Equity remains unprotected in

this case, so obviously it needs to increase the protective power of this instrument considered the fundamental and other objects of its creation (base of extra charge) (pointer 9).

The format of financial reporting doesn't mean just a list of items and their groups (sections) placed in different statements. It is a projection of accounting for capital methodology on society information requests. The results of the research [1] have proved that the conceptual model of the format of public postindustrial corporations financial reporting should be based on the emphasis of key criteria, dominant in users information requests (Fig. 2). Such substantiation, taking into account the subject of financial reporting, covers the concept of capital maintenance in its various forms (financial, physical and intellectual) and the theory (paradigm) of capital augmentation – accounting income concepts (accounting interpretation of capital increase from the standpoint of the proprietary, entity, residual equity, enterprise and fund theories). The theoretical basis of financial reporting format is formed, first of all, by the fundamental balance sheet theories (static, dynamic, organic and econometric) and content accounting theories (economic, sociological, ethical, institutional and others).

Essential amount of the equity capital of modern companies is formed by the non-material economic potential. In the financial statements of the majority of translational corporations more than a third of the assets value is related to the non-material (informational and intellectual) economic resources. The problems of acknowledgment, assessment and cost representation of such type of assets in the public accounting of the corporations (first of all of the socially meaningful ones in the global socio-economic environment) are well-known. Quite obvious is the fact that the existing problematic may not be solved either within the modern accounting theory or on the basis of any standardization versions. The overcoming of the said problem (for instance, quantification of such type of assets – quantitative expression of their qualitative characters for the following measuring stage, i.e. giving the numerical value result) by the national and foreign scholars is viewed in the elaboration of the new institutional accounting and reporting theory which will allow for better development of its methodology.

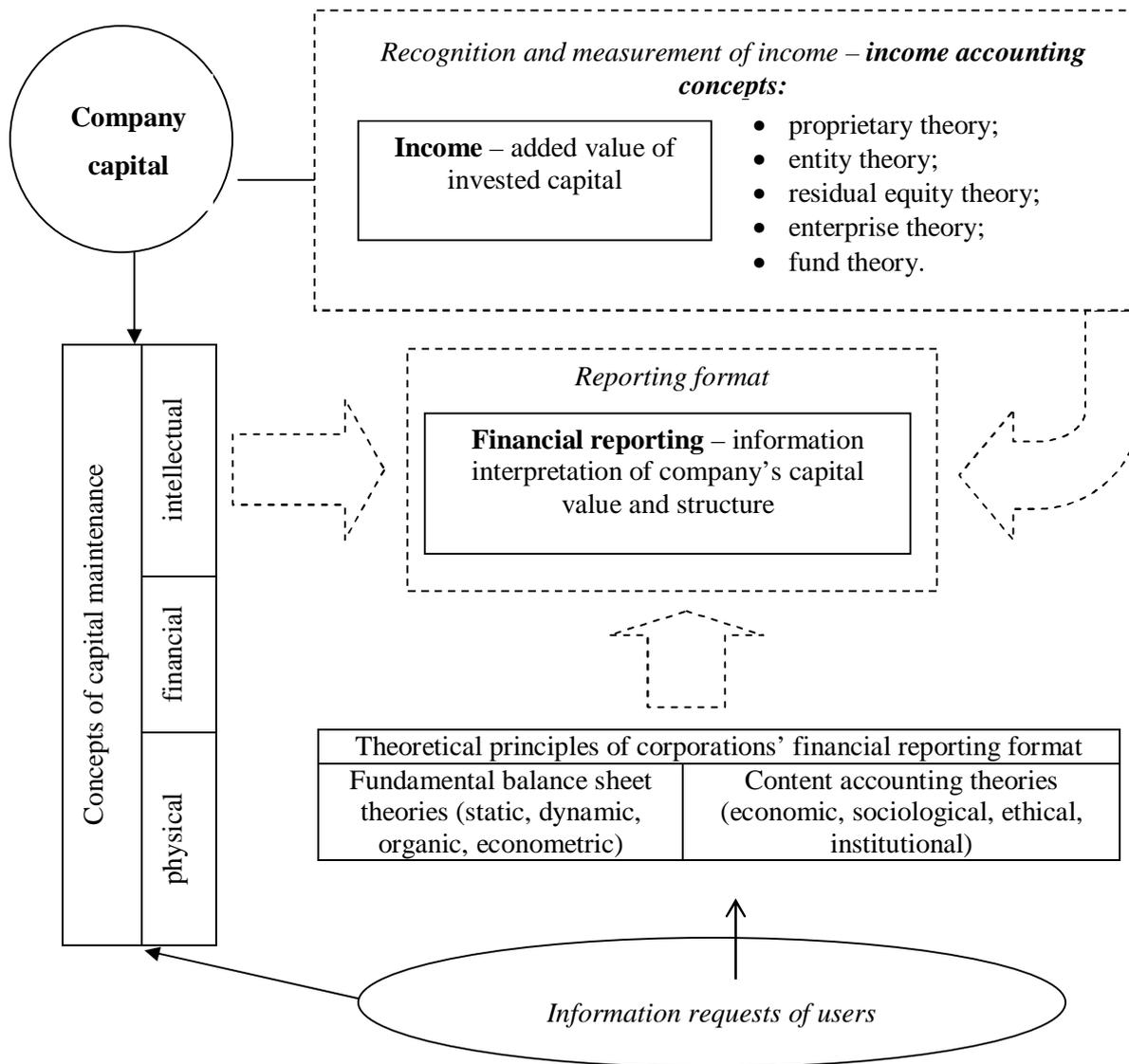


Fig. 2. Conceptual basis of financial reporting format of postindustrial corporations

### Conclusions and suggestions of the further investigations

The mentioned problems as to the condition and possible ways of adaptation of the traditional format of financial statements of the corporations to the modern business conditions, as well as the existing obstacles for the formation of new conceptual and methodological grounds of corporate accounting and, at the same time, acute practical problems in the new type of the formalized indexes are actualized by the research towards the elaboration of the corporations accounting public conception adequate for the modern economy.

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## INFORMATION AND PROTECTION POLICY IN THE CONTEXT OF CONSUMER ADVOCACY SOLUTIONS IN THE POLISH LIFE INSURANCE MARKET

**Abstract.** The article deals with the issues related to the Polish life insurance market in the context of applied information and protection policy solutions. The role of applying a new approach to protect consumer rights in the insurance market is highlighted. The importance of setting new regulatory standards and practices on the part of supervisory authorities has been emphasized in order to increase the transparency of products and the application of certain solutions or the prohibition or limitation of the sales of certain insurance. On the basis of data from the security institutions, the main problems of the Polish life insurance market from the perspective of consumers have been presented and the practices necessary to protect clients are identified.

**Keywords:** life insurance market, consumer protection

### Introduction

In the period of growing discontent resulting from insufficient consumer protection in the life insurance market, especially in relation to investment opportunities, insurers' information policies and insurance awareness have implications for the entire insurance market and the issue of protection of consumer rights and interests is gaining momentum.

The new approach to the protection of purchasers of insurance services and the strengthening of regulatory and supervisory activities in this area, which is the consequence of transformations in the regulatory and supervisory paradigm throughout the financial sector, is of particular importance. When diagnosing market issues from a consumer perspective, it should be emphasized that the potential for consumer advocacy for information and protection policies is

a new challenge for the insurance industry as a whole, and for supervisory and security institutions to ensure an adequate level of protection for the life insurance market.

The aim of the study is to present the reasons for the major changes in the principle of the highest trust in the insurance market and the main problems of the life insurance market from the perspective of consumers, which led to the need for significant intervention by regulators on information obligations of insurers and the application of specific solutions on accessibility to information, with special attention to the so-called transparency.

### 1. The importance of information and protection policy in the insurance market

The changes in the approach of customers and insurers to insurance contracts in the market of business insurance indicate that the principles of trust that the entities operating in these markets have used so far, have undergone significant evolution. The original conception of the highest trust in insurance was due to both the difference in the insurance contract and to the fact that the contract was so special that it required both parties to adhere to the principles of the highest trust<sup>1</sup>.

The main reason for the major changes in the principle of the highest trust in recent years is primarily different from the original forms of the process of acquiring information, which changed radically from the beginning of the operation of the

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<sup>1</sup> J. Lowry, *Whither the duty of good faith in UK insurance contracts*, Connecticut Insurance Law Journal 2009, vol. 16.1, p. 110.

first insurance contracts. In today's increasingly conscious world, as a result of activities undertaken mainly by EU legislation, there is a need for significant interventions by supervisory authorities with regard to the information obligations of insurers and the application of specific solutions on information accessibility, with particular reference to the so-called transparency.

Transparency is related to the general principles of the functioning of the financial and insurance market as well as to the way information is to be performed, which is reflected in the requirements for the creation of contractual consumer protection patterns in the insurance services market, reflected in the numerous EU directives<sup>2</sup>.

They use the notion of transparency with regard to the information obligations of insurers in insurance service delivery processes, in line with the concept commonly referred to as the right to information. On the other hand, their primary goal is to equalize the chances of the weaker side of the insurance market and the existing insufficient information of the covered insurance entities. Although the solution deals with the purchasers of insurance services, their more universal character should be emphasized in relation to the imposition of obligations on the insurers to maintain transparency towards all policyholders and insured persons.

The discussion, which is conducted both among practitioners and scientists in the field of transparency, rather than its lack, is causing and deepening the threat to consumer safety in the insurance market, hence the essence of the problem is the right information policy. Information is necessary for both parties to the insurance contract in order to make an informed decision regarding the conclusion of the contract on the terms and conditions specified therein. On the one hand there is a professional entity (insurer or insurance broker) characterized by a distinct advantage over purchasers (policyholders, insured), which are the

weaker side of the market and the insurance relationship.

Protection of the weaker side of the market through information is based on the assumption that the existing market imbalance between the parties to insurance contracts can be effectively offset by imposing a stronger obligation to disclose information relevant for the policyholder to make a rational decision on the conclusion of the insurance contract<sup>3</sup>.

## **2. Protection of consumers' rights in the insurance market in the new financial market regulation and supervision paradigm**

Since the onset of the global insurance market, the issue of protection of consumer rights and their interests has never been the subject of such intense discussion as it is today. Undoubtedly, the introduction of a new regulatory and supervisory paradigm in the financial sector, as a consequence of the 2007-2010 crisis, has led to significant changes in regulatory standards and practices.

When analyzing trends in the fundamentals of financial markets regulation, it should be pointed out that in the 1980s, an old paradigm called the Washington Consensus<sup>4</sup>, based on the belief in the absolute rationality of financial markets, which may be subject to short-lived turbulence, but their proper functioning only required good access to information. Consequently, this consensus was based on the belief that this system was safe thanks to private risk management at the level of individual financial institutions, and the guarantees of the quality of this management were to be verified solely by public financial supervisory systems without external relations.

The crisis, that has hit the global financial markets, has shown that the rationality of markets and financial institutions based solely on trust, transparency and individual risk management has

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<sup>2</sup> K. Malinowska, *Transparentność w umowie ubezpieczenia – przemiana zasady najwyższego zaufania w prawo do informacji* [in:] *Informacja w prawie ubezpieczeń gospodarczych*, ed. B. Gnela, M. Szaraniec, LEX Wolters Kluwer business, Warszawa 2015, pp. 29-30.

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<sup>3</sup> M. Szaraniec, *Ochronne reżimy adresata informacji jako słabszej strony stosunku ubezpieczenia*, [in:] *Informacja w prawie ubezpieczeń gospodarczych*, ed. B. Gnela, M. Szaraniec, LEX Wolters Kluwer Business, Warszawa 2015, s. 36-37.

<sup>4</sup> E. Helleiner, *A Bretton Woods Moment? The 2007-2008 crisis and the future of global finance*, "International Affairs", vol. 86, iss. 3 (May 2010), pp. 619-636.

turned out to be unreliable, both for the small and the largest market institutions, and hence they started seeking new security policy solutions. The starting point for creating a new consensus, called the Basel one, after the crisis, is to assume that the financial market is fragile and cyclical, with a tendency for herd behavior, which requires the introduction of appropriate policies and the intervention of public institutions by banning certain measures or banning or limiting sales of certain products.

Therefore, in the Basel consensus the so-called macro-prudential supervision based on public risk management of the whole financial system, is crucial. Thanks to this financial security is becoming a public sphere<sup>5</sup>. In addition, the protection of the consumer, an important component of the supervisory system, has become a distinguishing feature of the Basel system. The characteristics of the old and the new regulatory and supervisory consensus of financial markets are summarized in table 1.

*Table 1*

**Characteristics of regulatory-supervisory consensus of financial markets**

<b>Areas</b>	<b>Perception of financial markets</b>	<b>Impact instruments</b>	<b>Supervision characteristics</b>
<b>Washington Consensus</b>	<ul style="list-style-type: none"> <li>- rational, wise and self-correcting,</li> <li>- corporate governance and business models as a consequence of free private choice,</li> <li>- financial innovation is an important component of financial security and stability.</li> </ul>	<ul style="list-style-type: none"> <li>- enhanced transparency,</li> <li>- private risk management,</li> <li>- market discipline supported by regulation.</li> </ul>	<ul style="list-style-type: none"> <li>- micro-prudential perspective</li> <li>- formal and superficial supervision,</li> <li>- isolated from politics,</li> <li>- security is a private domain.</li> </ul>
<b>Basel Consensus</b>	<ul style="list-style-type: none"> <li>- cyclical, unreliable, no guarantee of self-repair,</li> <li>- corporate governance and business models are subject to public scrutiny,</li> <li>- financial innovation can destabilize the financial system.</li> </ul>	<ul style="list-style-type: none"> <li>- enhanced supervisory powers,</li> <li>- regulatory discipline supported by the market,</li> <li>- public financial risk management.</li> </ul>	<ul style="list-style-type: none"> <li>- macro-prudential perspective,</li> <li>- material and deep supervision,</li> <li>- penetration by politics,</li> <li>- security is a public domain,</li> <li>- consumer protection is an important component of the supervisory system.</li> </ul>

*Source: J. Monkiewicz, M. Monkiewicz, Tendencje rozwoju ochrony konsumentów na rynku ubezpieczeniowym. Nowe koncepcje i rozwiązania, „Rozprawy Ubezpieczeniowe”, Journal 18 (1/2015), p.7.*

Next to the emphasis on macro-prudential perspective is the creation of a separate consumer protection watchdog, which has found its practical appeal in the creation of several European institutions such as the European Banking Authority (EBA), the European Insurance and Occupational Pensions Authority (EIOPA) and the European Securities and Markets Authority (ESMA), whose key tasks are protecting consumer interests in financial services, including insurance and creation of pro-consumer policies in all EU countries.

The resulting system of supervision over financial markets has made use of the precautionary principle. The Financial Services Action Plan has received considerable political support, resulting in a European recovery plan to restore and maintain

financial market stability<sup>6</sup>. All these initiatives undertaken by the European Union have led to the creation of a European Financial Supervision Authority (ESFS), which was also involved in overseeing national and macro-prudential oversight.

The basic consumer protection objectives are based on ensuring transparency, simplicity, access to the insurance market and the integrity of the

<sup>5</sup> J. Monkiewicz, M. Monkiewicz, *Tendencje rozwoju ochrony konsumentów na rynku ubezpieczeniowym. Nowe koncepcje i rozwiązania*, „Rozprawy Ubezpieczeniowe”, Journal 18 (1/2015), pp. 6-7.

<sup>6</sup> M. Kawiński, *Ochrona konsumenta w agendzie Europejskiego Nadzoru Ubezpieczeń i Funduszy Emerytalnych. Kierunki zmian* [in:] *Ochrona konsumentów na rynku ubezpieczeniowym w Polsce*, pod red. J. Monkiewicza i M. Orlickiego, Wyd. Poltext, Warszawa 2015, p. 187.

parties involved in the consumer relationship. The EIOPA strategy indicated that the following objectives should be met:

- 1) create conditions for consumers to make informed choices,
- 2) create a framework for proper sales practices,
- 3) create conditions for better management of insurance products and their availability and suitability,
- (4) promote the development of effective dispute resolution systems,
- (5) support the development of insurance guarantee schemes to protect insured against the risk of insolvency of insurance companies.

### 3. Main problems of the Polish life insurance market from the perspective of consumers

Taking into account the relationship and the degree of confidence of clients in the Polish insurance market it should be emphasized that in recent years, especially due to inadequate practices in the sale of investment life insurance products, the rules within so-called product intervention as one of the basic consumer protection instruments are becoming of great importance<sup>7</sup>. By pointing to the reasons for the negative customer approach to certain products, resulting from both their design and low profitability, and the sales policy used by insurers, it is possible to diagnose essential market issues from a consumer perspective. It is of particular importance to obtain accurate information on the effectiveness of life insurance products, especially in the face of growing threats arising from high levels of difficulty, or even lack of access to information about these products (especially their emissions and their effectiveness). This may lead to further negative evaluation of products by market participants, which is reflected in the allegations raised in complaints to the Financial Ombudsman. By observing their numbers and their share in recent years, consumers have been reporting more and more comments on savings products, as summarized in table 2.

<sup>7</sup> For more see: J. Łańcucki, *Interwencja produktowa jako instrument ochrony konsumentów w sektorze ubezpieczeń*, [in:] *Ubezpieczenia we współczesnym świecie. Problemy i tendencje* pod red. I. Kwiecień, Wydawnictwo UE we Wrocławiu, Wrocław 2017, pp. 128-136.

Table 2

### Number of consumers' complaints to the Financial Ombudsman

Specification	No. of complaints		
	2014	2015	2016
Lower value of the policy buyout	123	226	432
Incorrect policy management	25	23	26
Tardiness in policy buyout	5	10	1
Refusal to redeem the policy value	12	13	16
Oddalenie roszczenia Dismissal of the claim	1 701	1 866	2 279
Dispute over the amount of benefit granted	480	517	842
Tardiness in winding-up proceedings	78	76	31
Contributions: amount, refund, call for payment, etc.	1 299	753	585
Refusal of continuation of insurance	20	30	29
Procedures used by the insurance company	36	43	32
Refusal to inspect the file	22	149	56
Change of the insurance sum	5	2	5
Change in GIC during contract term	10	3	11

Source: Own study based on data from the Financial Ombudsman's Office.

An increasing number of claims and complaints among consumers of Insurance Capital Funds life insurance show great dissatisfaction with these products. At the end of 2016 they occupied a high position in the group of complaints. In Section I, as many as 1053 applications concerned group 3 insurance. The most frequently cited claims against life insurance insurers were the refusal of a claim by an insurance company, a dispute about the amount of the claim, overdue claims settlement; low or total refusal to pay the policy value and high liquidation fees in case of resignation from ICF life insurance contract

### 4. Practices applied in the field of consumer protection in the Polish life insurance market

The actions taken in recent years by the supervisory and protection institutions in the financial market, including insurance, expressed in particular in the legislative texts, aim at eliminating the problems that concern the offer of life insurance products. The increasing number of complaints and claims reported by the clients of the lack of transparency in the presentation of the properties of savings and

investment products and the different possibilities of their profitability, or the misselling<sup>8</sup> phenomenon, led to the need to make changes in the law. They aim to tighten regulations on the safety of the financial market clients and intensify the controls on their compliance by both financial supervisors and consumer ombudsmen.

Thanks to the cooperation of EIOPA with national supervisors and stakeholders, it is possible to obtain information on consumer trends, which is then published in the report of the Department of Finance for Innovation and Consumer Protection. This includes the number of complaints, sales volume, implementation of modern solutions in products and sales, as well as other signals from the market. Previously collected reports allowed to build statistics on the most common causes of consumer complaints. These include: unsatisfactory benefits received, slow referrals, errors in settlement and incompatible return rates (in case of investment products).

There were also many complaints about customer service, breach of privacy regulations, incorrect or incomplete documentation, and the lack of access to the on-line platform. National supervisors also pointed to a number of problem areas, including: the spread of online comparables, price competition, the delivery of erroneous or incomplete information to consumers, the complexity of structured products, the reservations regarding the sale and servicing of mobile phone insurance and bank accounts.

For most life insurance products, whose structure is complex, such as portfolio-based financial instruments or complex investment strategies, the most common problem is the transparency gap in the structure itself. This is due to both lack of standardization at the product development stage and deliberate lack of information on the composition of the instrument or investment strategies. Financial advisors providing cash allocation services at the stage of concluding the contract should provide advice and customer awareness of the investment and savings opportunities as well as customer rights under consumer protection provisions for financial services. In fact, they are most often linked by capital or through commission schemes with financial institutions, hence their informational policy is generally unreliable and,

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<sup>8</sup> For more see: J. Cichorska, *Misselling, czyli sprzedaż niepotrzebnych instrumentów finansowych i jej skutki. Stan prawny w Polsce i Wielkiej Brytanii*, *Journal of Insurance, Financial Markets & Consumer Protection*, No. 24 (2/2017), pp. 18-34.

as a result, the information provided to the client is non-exhaustive and non-objective<sup>9</sup>.

One also needs to pay attention to situations when the risk of customer ignorance increases, for example by purchasing a distance policy (via the Internet, telephone, etc.) or someone else's account. Simplification of the contract by electronic means influences the decisions of consumers who, by clicking on the appropriate commands displayed on the screen, are driven by impulses and often make ill-considered decisions<sup>10</sup>.

According to the Polish Financial Supervision Authority's<sup>11</sup> guidelines on insurance distribution, based on Polish legal acts, the functioning of a reliable information policy by insurers is regulated in the guidelines of the supervisory authority of the Polish insurance market, the insurance company should "note in the documentation" that the client has read all the factors that affect their decision to join the insurance contract. If the "record in the documentation" means the client's signature, then there is a problem with remote contracts, or someone else's account where this procedure seems to be quite difficult. Still, it does not relieve the insurer from a fair presentation of the terms of its cooperation.

Any information about the characteristics of the product, such as the scope or object of protection, should be included in the information material and then communicated to the customer. However, the material should also include clearly and transparently presented issues of possible restrictions and exclusions, i.e. situations in which an insurance company limits the payment of benefits or compensation or does not pay them in general. Similarly, in the case of investment products, the insurer should inform about the real risks associated with the investment, as well as the fees which may also become the burden of the policyholder. The information material, as well as the general terms of insurance, and all contract terms

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<sup>9</sup> B. Frączek, *Deficyt transparentności informacji dotyczącej produktów oszczędnościowo-inwestycyjnych jako zagrożenie bezpieczeństwa konsumenta na rynku usług finansowych*, „*Journal of Insurance, Financial Markets & Consumer Protection*”, No. 24 (2/2017), p. 42.

<sup>10</sup> I. Adrych-Brzezińska, *Obowiązek informacyjny w umowach ubezpieczenia zawieranych na odległość z udziałem konsumentów*, "Wiadomości Ubezpieczeniowe" 2015 no. 2, pp. 20-21.

<sup>11</sup> *Insurance distribution guidelines annexed to Resolution No. 184/2014 of the Polish Financial Supervision Authority dated 24 June 2014 (Official Journal of the Polish Financial Supervision Authority, item 13).*

should be made available to the consumer in the paper or electronic form.

The final point of the Insurers' Information Policy Guidelines includes a recommendation for a product card. It is not an integral part of the contract but is the previously mentioned information material that the distributor should use when selling the product. The product card contains the purpose, characteristics and the whole mechanism of functioning of the insurance.

The provision of Article 15 of the Insurance and Reinsurance Act<sup>12</sup>, which provides for a broader obligation to unequivocally and comprehensively formulate insurance contracts, not only for contracts and general terms of insurance, but also for all other contractual models, serves undoubtedly as a factor which improves client's situation. On the one hand, regulation improves customer safety and, on the other one, is aimed at increasing product interventions, which can be a very important instrument for consumer protection in the life insurance market. The principles of this intervention are covered by EU regulations, which provide wider market monitoring, including investment products.

### Conclusions

In the last few years, the financial market, including the insurance branch, has seen a tendency for changes in the creation of insurance services. Particular attention should be paid to the application of specific solutions within the information policy of insurers, under the emphasis on increasing the transparency of products in terms of information obligations. These measures, on the one hand, are the result of the recent crisis in the financial markets and the change in the approach to consumer protection supervision. On the other hand, they are also the consequence of inadequate practices used by insurers to sell products for life, especially those associated with investment opportunities.

In order to avoid the aggravation of negative phenomena related to difficulties or lack of information on insurance services, the regulatory and supervisory activities of financial market institutions should be extended, with particular emphasis on forcing insurers as stronger players in insurance distribution practices, thus leading to increased protection and customer security, which will help eliminate major market issues in the future.

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<sup>12</sup> Act of 11 September 2015 on insurance and reinsurance business (Journal of Laws 2016, item 1844).

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## **DIAGNOSTICS OF INVESTMENT ATTRACTIVENESS OF BUSINESS ENTITIES IN CONDITIONS OF EUROPEAN INTEGRATION**

**Abstract.** The article substantiates the relevance of unification, harmonization and development of the theoretical and applied base of diagnostics of investment attractiveness of enterprises in the conditions of European integration of Ukraine. The theoretical and legislative principles of diagnostics of investment attractiveness of enterprises are critically analyzed. Based on the study of domestic and foreign diagnostic practices, as well as the challenges of European integration, it is proposed to apply a comprehensive approach to assessing the investment attractiveness of enterprises. The method of comprehensive multi-layered diagnostics of investment attractiveness of enterprises is improved, which harmoniously combines the following priority diagnostic components: investment attractiveness of the country, region, industries in which the object of investment functions, and direct investment attractiveness of the enterprise.

**Keywords:** investment attractiveness, enterprise, diagnostics, indicators, criteria, European integration.

### **Formulation of the problem**

At the present stage, the key task faced by an investor in an investment market is the competent selection of potential investment objects, which is carried out on the basis of a substantiated

information base. Such information provision is the result of the implementation of targeted diagnostic procedures. Today it is commonly believed that investors focus only on the assessment of potential investment objects. However, in the foreign investment environment, diagnostic accents are more extensive and concern not only the assessment of the company's ability to provide a high level of efficiency of the invested resources, but also cover the investment attractiveness of the country, regions, and the prospects for the development of the sphere of activity in which the enterprise-recipient operates.

The lack of a qualitative domestic normative and methodological base in the field of diagnostics of investment attractiveness of enterprises, its inconsistency with international standards, diversity, bias and contradiction of the existing methodical and methodological support for evaluating investment attractiveness, as well as the low efficiency of existing diagnostic tools in this area, causes significant problems regarding implementation of the diagnostics of investment attractiveness at different levels of the national economy, becoming a specific sticking point towards European integration of Ukraine. Taking

into account the current challenges of European integration and the necessity to attract external investment resources for the progressive development of the domestic economy in general and entrepreneurship in particular, the unifying, harmonization and development of normative and methodological provision of diagnostics of investment attractiveness of enterprises are an important problem.

### **Relevance of the chosen topic**

In the context of the current socio-economic crisis in Ukraine, the key to the stable functioning and long-term development of enterprises is investment activity. Taking note of the high level of competition in investment market, business entities are as much as possible to attract the attention of potential domestic investors in order to obtain additional capital. Taking into account active processes of European integration of Ukraine, enterprises-recipients also try to increase their competitiveness in foreign markets in order to become the object of foreign investment. Exactly the level of investment attractiveness of business entity plays a decisive role in making an investor decision on the appropriateness of investing. At the same time, the contradictions and collisions of the current domestic normative and methodological base on the diagnosis of the investment attractiveness of business entities, as well as its non-harmonization with international diagnostic norms and standards, cause the emergence of significant problems in this area. In particular, such problems lead to inadequate diagnostic results in assessing the investment attractiveness of an enterprise, which can be significantly different from the results of diagnostics by foreign methods used by foreign investors. It accordingly does not allow to accept competent and effective administrative decisions to domestic business entities regarding increase of investment attractiveness. All of the foregoing determines the relevance of the selected subject and justifies the necessity of carrying out research related to the harmonization and improvement of existing methods of diagnosing investment attractiveness of enterprises in the conditions of European integration.

### **Analysis of recent researches and publications**

Despite the prevalence of investment subject in economic sources, which in recent decades is the subject of research of a large number of scientists, the dynamic changes in the environment requires its continuous improvement and development. We mean that in the conditions of European integration there is a need for harmonization of the national scientific-methodical and legislative basis of diagnostics of investment attractiveness with the best European achievements. Thus, there is a need for the formation of a unified theoretical and applied foundation in this area, which will be operated by both domestic and foreign individuals.

Today, the definition of "investment attractiveness of the enterprise" has a variety of interpretations in both domestic and foreign literature. Many publications devoted to problems of identification and diagnostics of investment attractiveness of the enterprise, however, there is still no single interpretation of this concept. Based on thorough studying and systematization of materials from specialized literature sources [1-4], such key existing approaches to the interpretation of enterprise investment attractiveness in the diagnostic context as factor, internal, integral and comparative approaches are identified. Thus, according to the factor approach, the investment attractiveness of an enterprise is considered as a set of characteristics of the internal and external environment of the enterprise's functioning. Within the internal diagnostic approach, the investment attractiveness of an enterprise is treated as a set of characteristics of the internal environment that are important for a potential investor. In scientific works, this approach is characterized as such, which, first of all, involves an assessment of the financial and economic state of the enterprise. In the framework of a comparative or rating approach, the investment attractiveness of an enterprise is defined as a relative characteristic of an enterprise as one of the objects of investment in the future. In this approach, rating systems are used to diagnose the investment attractiveness of an enterprise. Each of the above-mentioned approaches has both advantages and disadvantages in the context of the treatment of the investment attractiveness of an

enterprise, since it does not comprehensively cover all aspects of this economic category and thus does not provide its integral diagnostics. The key drawbacks in the approaches applied to the diagnosis of investment attractiveness of the enterprise have led to the emergence of such an approach as an integral one. Under this approach, the investment attractiveness of an enterprise is interpreted as an integral characteristic of an enterprise and is investigated as an object of future investment. The peculiarity of this approach is that the investment attractiveness of an enterprise is represented not only by one integral indicator, but by their system of indicators.

Therefore, taking into account the above approaches to the treatment of the investment attractiveness of an enterprise, as well as the methodology for its evaluation, it is proposed under the investment attractiveness of the enterprise to understand the integral complex characteristics of the investment object, which reflects the results of the diagnosis of representative quantitative and qualitative indicators of the internal and external environment and provides its position in the struggle for investment resources.

Along with the above-discussed scientific approach to today, the principles of diagnostics of investment attractiveness of enterprises are defined in the current national normative and methodological base. The main disadvantage of domestic legislation in this area is the lack of uniformity, systematicity and harmonization with international standards. Thus, in Ukraine, the basic diagnosis of investment attractiveness of enterprises is "Methodology of the integrated assessment of investment attractiveness of enterprises and organizations", approved by the Order of the Agency for the Prevention of Bankruptcy of Enterprises and Organizations No. 22 of 23.02.1998 [5]. Having thoroughly studied the above-mentioned technique, one can infer the essential preponderance of its disadvantages over the advantages. Among the disadvantages that characterize the unsuitability of using this technique, the key is its obsolescence since the updates have not been around for almost 20 years. In addition, informational groundlessness should be

noted as the methodology is based on the calculation of more than 40 indicators, which characterize exclusively the financial and property status of the enterprise and do not reveal other areas of functioning. Such a large number of indicators complicate the procedure of computing, while calculating the values of indicators is based on inactive financial statements. Another disadvantage is that the methodology does not provide an interpretive scale of the integral indicator, which makes it impossible to formulate a general conclusion about the level of investment attractiveness. The sign that characterizes this technique as unsatisfactory is that it is based on the use of outdated software "INTEGRAL".

### **Purpose and objectives**

Taking into account the results of the analysis of the theoretical and legislative basis, the purpose of the study was determined as unification, harmonization and development of theoretical and applied principles of diagnostics of investment attractiveness of enterprises in the conditions of European integration.

### **Main material and results of the research**

Based on the study and analysis of existing domestic and foreign methods of diagnosing investment attractiveness of enterprises, it was established that the most common is a comprehensive approach in this area, based on the evaluation of various indicators at different levels. So, systematizing existing approaches to the diagnosis of investment attractiveness, it is proposed to distinguish the following priority diagnostic components, such as:

1. Investment attractiveness of the country in which the enterprise operates.
2. Investment attractiveness of the region in which the enterprise operates.
3. Investment attractiveness of the industry to which the enterprise belongs.
4. Investment attractiveness directly to the enterprise.

In fig. 1 the comprehensive multi-layered method of diagnostics of investment attractiveness of the enterprise is offered.

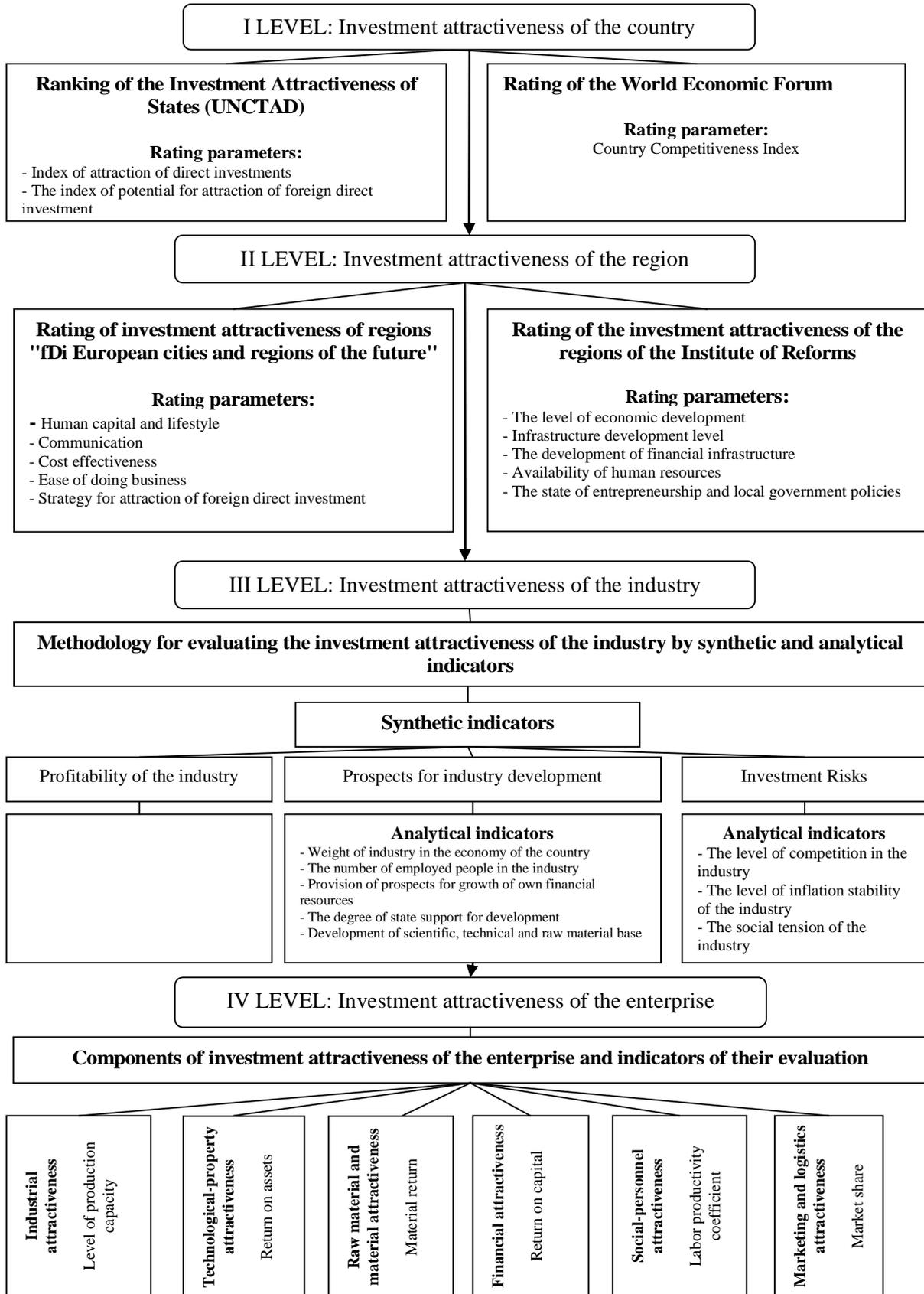


Fig. 1. Method of comprehensive multi-layered diagnostics of investment attractiveness of the enterprise

The first stage of implementing the multi-layered diagnostic method of investment attractiveness of an enterprise is to assess the investment attractiveness of the country. For any country that is on the path of transformational changes, the topical issue is the effective management of investment processes, which affect, first of all, its socio-economic development. Taking into account the fact that for today there are certain differences between national and European practices in the diagnosis of investment attractiveness, it is worth taking into account the best international experience in this field.

Today, one of the most prestigious international ratings for assessing the investment attractiveness of states is based on the methodology developed by the United Nations Conference on Trade and Development (UNCTAD). The ranking of countries is carried out in two indices [6]:

1. The Inward FDI Performance Index.
2. Index of FDI Potential Index.

Another, no less credible, rating of the World Economic Forum, whose main objective is the annual publication of the Global Competitiveness Index (GCI), should be highlighted. It contains 12 elements of competitiveness, which are defined in accordance with such publicly available statistics as: 1) the quality of the institutions; 2) infrastructure; 3) macroeconomic stability; 4) health and elementary education; 5) higher education and vocational training; 6) efficiency of the market of goods and services; 7) labor market efficiency; 8) development of the financial market; 9) technological level; 10) the size of the domestic market; 11) competitiveness of companies; 12) innovation potential [7].

Regarding the assessment of the investment attractiveness of the region, unfortunately, a characteristic feature for Ukraine is unevenness of socio-economic development of cities and regions of the country, the reasons of which are the differences in the levels of investment attractiveness of the regions. That is why it is advisable to carefully implement the second stage, related to the diagnostics of investment

attractiveness of the region, in the context of an integrated assessment of the investment attractiveness of the enterprise.

In the second stage, attention should be drawn to the rating methodology for assessing the investment attractiveness «fDi European cities and regions of the future» of the region in terms of human capital and lifestyle, communication, economic potential, cost efficiency, ease of use doing business and attracting foreign direct investment [8].

Another methodology for rating assessment of the investment attractiveness of the regions, based on the application of the mathematical model and technology of processing the statistical data of the Institute of Reforms, is carried out on the basis of objective criteria, which include [9]:

- 1) the level of economic development;
- 2) the level of infrastructure development;
- 3) the development of financial infrastructure;
- 4) availability of human resources;
- 5) the state of entrepreneurship and the policy of local government.

The third stage of the comprehensive multi-layered diagnostics of the investment attractiveness of the company involves an assessment of the investment attractiveness of the industry. Such an assessment may be based on the use of a synthetic and analytical methodology for evaluation [4]. Synthetic indicators are summarized in the following groups: 1) profitability of the industry; 2) the prospects of industry development; 3) investment risks. Each of the above groups contains a list of analytical indicators that have rank values and determine the importance of a generalized synthetic index. In turn, the level of profitability of the industry is determined by such indicators as: 1) profitability of assets; 2) profitability of equity capital of enterprises in the sector provided that there is a sectoral financial leverage; 3) profitability of sold products. Estimation of the prospects of the industry development is based on the calculation of the following indicators: 1) weight of the industry in the country's economy - the share of production in the GDP; 2) the number of employed people in the

industry; 3) ensuring the prospects of growth of own financial resources, determined by the volume and weight of investments from their own sources of financing, the share of equity in the total assets; 4) the level of state support for development - the volume of state (centralized) investments, tax and export privileges; 5) development of the scientific-technical and raw material base of the industry, which is measured on the basis of expert assessments. The diagnosis of the level of investment risks involves taking into account such analytical indicators as: 1) the level of competition in the industry; 2) the level of inflationary stability of the industry; 3) the social tension of the industry [4].

The final stage of the proposed method is to assess the investment attractiveness of a particular enterprise. In order to ensure the objectivity of the received diagnostic results, it is necessary that the assessment should be conducted directly by the potential investor or his representatives. In addition, there is a possibility of self-diagnosis of investment attractiveness directly by the specialists of the enterprise.

On the basis of studying and systematization of literary sources [1-4; 10] established that the diagnosis of the enterprise-recipient should be conducted in the context of such components of its investment attractiveness, such as:

1. Production attractiveness, which reflects the availability of appropriate production conditions for the production of quality products, assortment and nomenclature within the specified time; production capacity of the enterprise, level of innovation, diversification, rhythmicity and defect production.

2. Technological and material attractiveness demonstrates the availability of labor facilities, their status and suitability level in order to meet the needs of production and economic activity; characterizes how the enterprise is equipped with production and warehouse premises, equipment, accessories, tools, production technologies.

3. Raw materials and material attractiveness characterize the provision of production activities of a potential object of investment in raw materials, the level of their cost and efficiency of use.

4. Financial attractiveness characterizes the financial condition of an enterprise, how much it can cover current liabilities, carry out self-financing, reproduce capital, receive loans and attract investment resources.

5. The social and personnel attractiveness demonstrates the presence of skilled workers in the company who have the appropriate level of knowledge, skills and experience to perform their professional duties, and opportunities to improve their qualifications.

6. Marketing and logistics attractiveness reveals the ability to sell products with existing marketing tools and objects of logistics infrastructure, reflecting the presence of effective market positioning instruments, sufficient logistics infrastructure.

It should be noted that many authors offer different indicators of evaluation of various components of the investment attractiveness of the enterprise. This, in turn, complicates the process of choosing representative indicators, the direct implementation of settlement procedures, the selection of adequate criteria, the interpretation and aggregation of diagnostic results.

In order to comprehensively characterize each of the above-mentioned components of investment attractiveness, we propose to highlight the most generalizing indicators that will provide a comprehensive description of a specific component of investment attractiveness. In particular, it is recommended to use the following indicators to diagnose the relevant components of the investment attractiveness of the enterprise, such as:

- for the industrial component - the level of utilization of production capacity;

- for the technological-property component - return on capital;

- for the raw-material component - material return;

- for financial component - capital outsourcing;

- for the social-personnel component - the coefficient of productivity of labor;

- for the marketing and logistics component - the market share.

For the implementation of the last stage, it is necessary to calculate the isolated aggregate indicators of the components of its investment attractiveness. In the future, it is necessary to compare the obtained values of the indicator-identifiers of the level of each component of investment attractiveness with the criteria (for all the above-mentioned indicators, except for the market share, the criterion is the correspondence to the medium-scale value). Based on the analysis of diagnostic theory and practice, it is proposed to consider three probable cases:

- if the value of the indicator is more than the criterion value, then the component is assigned a "high attraction" score;

- if the indicator value is (or approximated) to the criterion, then the component is characterized by "average attractiveness";

- In the case where the value of the indicator is less than the criterion, then the component is with a "low attractiveness" for a potential investor.

On the basis of the definition and calculation of all the above-mentioned indicators, as well as the interpretation of their meanings, comprehensive conclusions are drawn about the expediency of investing in the enterprise and the possibility of improving the state of one or another component of the investment attractiveness of the entity.

### **Conclusions and prospects for further research**

Based on the results of the study, the following conclusions can be formulated: 1) approaches to the interpretation of the concept of "investment attractiveness of the enterprise" are considered and analyzed, and on the basis of this, it is formulated and substantiated its unified interpretation in the diagnostic context by the integrated approach; 2) the domestic legislative base on conducting diagnostics of investment attractiveness of enterprises in the conditions of European integration was investigated, the results of which identified the problematic aspects in this area; 3) the method of comprehensive multi-layered diagnostics of investment attractiveness of enterprises is developed and substantiated. The key feature of the proposed method, which embodies the best foreign experience in this area and thus

provides advantages of its use in conditions of European integration, is the complex consideration of the investment attractiveness of different levels of operation of the enterprise, in particular, such as: investment attractiveness of the country, region, industry, in which the object of investment is functioning, and it is directly the investment attractiveness of the enterprise.

Prospects for further research are the improvement and harmonization of diagnostics of such priority objects in European integration, such as creditworthiness, the threat of bankruptcy, financial state of the enterprise, etc.

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## DIGITALIZATION AS A TOOL FOR PROVIDING COMPETITIVE ADVANTAGES TO ENTERPRISES IN THE MACHINE-BUILDING INDUSTRY

**Abstract.** In such a climate, competition becomes ever more fierce and manufacturers must seize every opportunity and competitive advantage they can find. Increasingly, such advantages—along with new threats of disruption—come from digital technologies. A critical element of manufacturing innovation will be in the form of new business models, particularly regarding services and value-added offerings. In effect, simply making a good product may no longer be enough. Increasingly, what happens after the product is sold looms ever larger. Machine builders that successfully leverage services are using them to drive disruptive new business models that, in effect, enable them to charge for business outcomes—such as plant uptime—just as they now charge for physical products sold as a capital investment. Companies that don't harness services—by converging their service and digital journeys—will risk falling behind in a rapidly changing marketplace in which innovation and agility rule. The author considers digitalization as a basis for service-oriented business models and considers digitalization as a tool for ensuring the competitive advantages of machine-building enterprises.

**Key words:** competitive advantage, digitalization, service-oriented business models

### **Problem statement**

Machine builders in Europe and around the world have long felt the lure of the service-oriented revenue model as a driver of growth and new

revenue—one that significantly benefits their end-user manufacturer customers.

European manufacturers are celebrated for the high quality of their products, but a purely product-centric mindset may be a hindrance moving forward. As we will see, they risk falling behind their global competitors in the transition to service-oriented revenue models.

Despite a clear impetus to act, however, only a select few manufacturers have successfully transitioned to service models. We refer to this as the “service dilemma.”[15] The gap between the desire for services and their limited success has existed for decades.[16] Machine builders and end users agree strongly on their intention to move into services. However, they acknowledge that in the near term, services will not grow faster than products—a major inhibitor that is slowing the transition to services.

Service Dilemma defined:

1. Manufacturers are challenged to improve profitability
2. They invest in new services
3. New services increase complexity
4. Increased complexity creates profitability challenges

In effect, the services journey has now converged with the digital business journey. Many

European manufacturers are in the early stages of connectivity.[17] By accelerating their digital business transformation, they will be able to better navigate complexities of moving to the service-oriented revenue model with greater ease and speed, less cost, and more effectiveness.

Digital transformation isn't a technology or a product. Rather, it's a philosophy for using digital assets to change the way an organization runs. It involves realigning technology and modifying business processes to better engage employees, customers and other constituents of the extended enterprise. Digital transformation significantly improves the performance and reach of an enterprise and has become a top priority for IT and business leaders across the globe.

Digitization is reshaping the business landscape at an unprecedented rate. The disruption of established businesses used to take decades, but natively digital organizations such as Uber, Google and Amazon have disrupted their respective markets in fewer than 10 years.

#### **Analysis of recent research and publications**

Such prominent economists as M. Porter, A. Thomson, L. Bielykh, A. Yudanov, R. Fatkhudynov, O. Tereshchenko, K. Lemish, E. Andriievskia, O. Amosha and others have been studying the problem of ensuring competitive advantage of enterprises. However, these are only fundamental scientific works, which can not always find practical application in modern conditions of competition.

European manufacturing conjures images of modern production facilities churning out some of the finest products in the world—whether from Airbus or Audi, Rolls-Royce or Renault (to name a few). With more than two-thirds of all EU exports coming from manufacturing, the sector continues to be an important engine for growth.[1]

In a recent Cisco survey of executives from both industrial machine builders and end-user manufacturers<sup>8</sup> (see “About This Study”), 79 percent of global respondents believe that digital disruption will drive a moderate to major impact at their companies in the next three years. While that figure rises to 90 percent among Asia-Pacific nations (for this survey, China, South Korea, Japan, and India), it falls to

77 percent for European manufacturers (for this survey, Germany, France, Italy, and the United Kingdom)

Rolls-Royce Holdings is a pioneer in transitioning to the service-oriented revenue model. The company, the second-largest manufacturer of aircraft engines, has leveraged its expertise in maintaining and repairing jet engines, while leaving the airlines to their own specialty: flying. In an outcome-based model, Rolls-Royce is paid for continuous uptime, rather than waiting to fix engines once they falter.[13] A key component of this business model is that Rolls-Royce draws more added revenue when the airlines themselves succeed—not when their planes are grounded. As one analyst remarked about Rolls-Royce's TotalCare service, “They aren't selling engines, they are selling hot air out the back of an engine.”[14]

#### **The purpose of the article**

The purpose of the article is to highlight the notion of digitalisation as a basis for service-oriented business models and to reveal the competitive advantages of machine-building enterprises that can be secured through its implementation.

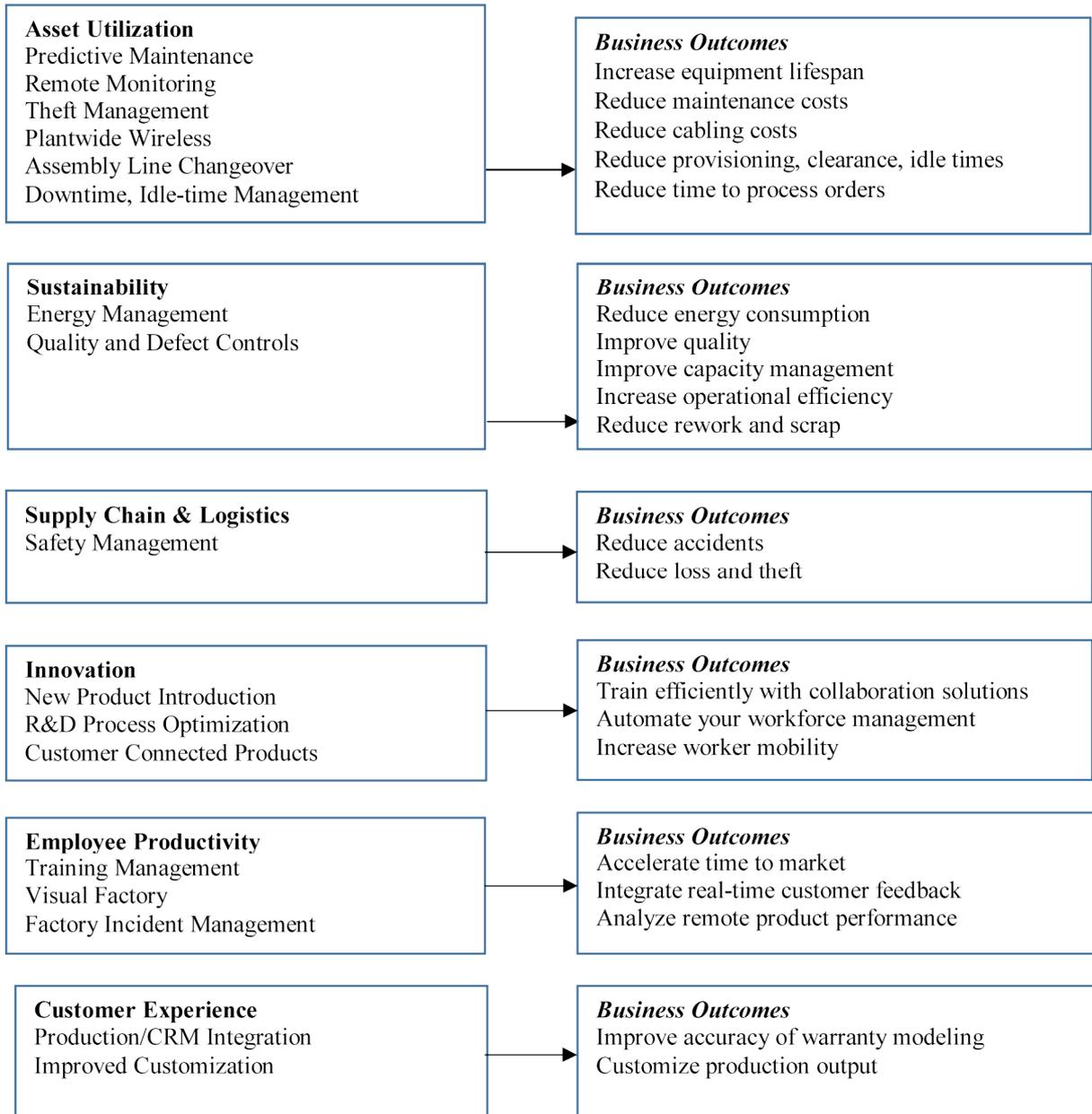
#### **Research materials**

Technology advances often bolster business models that drive innovation, efficiency, sustainability, and cost savings. Such advances in automation are causing many firms to rethink their overall strategy. In particular, the importance of connected products and connected machines in manufacturers' service-oriented strategies—along with the mounting complexity that they bring—is creating new opportunities and challenges.

While many machine builders and end-user manufacturers have a digital agenda, a considerable roadblock is cost, especially amidst decreasing growth and flat-to-down budgets. However, the pace of business is accelerating exponentially. Manufacturers will need to take advantage of self-funding opportunities. With the pace of business accelerating every day, manufacturers must create a sustained competitive advantage by managing their own disruption and transformation. This requires that they fundamentally change how they operate, with a greater degree of speed. The good news is

*Digitalization as a Tool For Providing Competitive Advantages to Enterprises in the Machine-Building Industry*

that manufacturers will capture significant value as they further digitize. It is such transformations that can become sources and provide competitive advantages of enterprises (Fig. 1)



*Fig.1 Sources and factors of formation of competitive advantages of the enterprises of the machine-building industry*

In a report by the Global Center for Digital Business Transformation, an IMD and Cisco initiative (“Digital Vortex: How Digital Disruption Is Redefining Industries”), nearly four of the top 10 manufacturing incumbents were considered vulnerable to digital disruption in the next three years. However, 41 percent of manufacturing respondents did not feel that digital disruption was

a C-suite concern.[18] Given the threat of disruption, such a lack of concern is clearly a mistake.

ZK Research has interviewed approximately 100 organizations that are aggressively pursuing a digital transformation strategy at varying rates and with different levels of success. Aggressive businesses are transforming the whole

organization, while other, more conservative ones are only making small, incremental changes. Based on several one-on-one interviews with business and IT leaders, ZK Research draws one significant conclusion: The most successful companies marry strong corporate leadership with digital initiatives and establish a high level of digitization. The more digital an organization is, the more likely it is to pull away from its peers and be a leader in its industry. A proof point of this comes from the book *Leading Digital: Turning Technology into Business Transformation* by George Westerman, Didier Bonnet and Andrew McAfee, which found that organizations that master digital transformation are 26% more profitable.

Businesses that choose to embrace digitization will realize a number of business benefits, including the following:

- **Capturing new market opportunities:** Digitization enables organizations to move much faster than ever before. When new market opportunities arise, a highly digital organization can catch the transition faster than the competition.
- **Improved customer experience:** Digitization enhances all aspects of the customer journey and can personalize the experience. This improved experience is a key to winning, retaining and growing customers—which is crucial to the long-term success of businesses in this highly competitive era.
- **Streamlined business operations:** Digitization can streamline processes by removing human latency through automation. Streamlined operations reduce operational costs and enable the staff to be more efficient.
- **Extending the reach of the company:** Digital technology enables businesses to manage and exploit all forms of digital channels and touch points. Organizations can use these new channels to reach more customers in more places around the globe.

The key theme for digital transformation is speed, as businesses must be able to operate faster than ever. Becoming a digital organization must be a top initiative for every business and IT leader today, as the long-term success of the business depends on it. Digital initiatives are led by

technology; however, a significant number of CEOs perceive technology as a key vulnerability for their organizations. The 18th Annual Global CEO Survey conducted by PwC in 2015 found that 58% of CEOs expressed anxiety about not being able to change their technology fast enough to keep up with the competition. ZK Research estimates that in 2015, businesses spent \$12 billion on technology to increase the level of IT agility and evolve into a digital organization. However, the network has yet to evolve. If organizations are to harness the potential of digitization, it's time to evolve the network.

For a company to evolve to a digital organization, IT and business leaders must form a tight partnership. Digitization is possible today because several technologies have matured and have come together at the same time, creating a “perfect storm” scenario:

- **Mobile devices:** Client evolution has exploded over the past half-decade. What was once deemed impossible to do on a mobile device is now the norm. Web browsing, voice over IP, video conferencing and streaming media are common today on mobile devices because of the evolution of smartphones, tablets and web-optimized laptops.
- **Cloud computing:** IT managers have been experimenting with cloud computing for a number of years. Today, enough best practices exist to allow enterprises to shift a significant portion of their IT infrastructure to cloud services or to build internal cloud infrastructure.
- **Analytics and big data platforms:** Digital organizations create terabytes of data, which can be gathered, prepped and analyzed to uncover new business insights. Historically, the big data platforms that used to handle the analytics were very expensive, and only the largest of organizations could deploy them. Today, big data platforms have become more diverse, so companies of all sizes can take advantage of them.
- **Internet of Things (IoT):** IoT is the networking of physical devices, vehicles, sensors, operational technology (OT) and other objects combined with business process change, data collection and analytics. IoT has the power to streamline process through automation, discover

new routes to market and significantly reduce costs. ZK Research estimates that IoT will lead to more than 50 billion additional connected devices by 2025.

One other component of digital transformation that is often overlooked is the network. All of the technology trends listed above are network centric, meaning the network plays a critical role in the success of these initiatives (Exhibit 2).

Unfortunately, few organizations have linked digital transformation to their network. ZK Research has interviewed businesses that have implemented or plan to implement a digital strategy, and the majority have not created a plan to integrate the network into their business strategies.

The promise of services exhibits a powerful pull on manufacturers that want to remain competitive in the digital age. Rather than simply selling an industrial machine for a one-time fee, for example, machine builders can offer a product that—once connected within the plant or, ultimately, across an ecosystem—can be offered as a service in a recurring revenue model. In addition, by virtue of being connected, the machine's performance and utilization data can enable new value-added offerings, including predictive maintenance, quality control, plant-floor efficiency, and customer engagement.

Many manufacturers struggle with the transition to services due to the immediate prospects of service revenue being smaller than those of traditional product offerings. They want the flexibility to leverage both CapEx and OpEx; but in order to achieve this, they need to diversify.

Moreover, the top goals of European manufacturers in pursuing a service-oriented revenue model are focused on enhancing current businesses by reducing production costs and improving productivity, and on deepening relationships with existing customers. These are, of course, laudable and important goals. However, they do not reflect the opportunity to pursue new growth opportunities. The opportunity to generate significant new growth rests upon the agility and insights that come with digitization.

Overall, the move from products to services is driving what could be called a “two-front war” in manufacturing—in effect, trying to maintain existing quality standards while at the same time moving into unexplored realms.

At the core of these challenges is the fact that manufacturers are not themselves “technology companies”; yet, services increasingly demand they must be. As General Electric CEO Jeffrey Immelt has stated, “All companies need to become Internet and software companies. The industrial world is changing dramatically, and those companies that make the best use of data will be the most successful.”[20]

Many European manufacturers are in the early stages of digitization and the transition to services. While some have begun to connect industrial machines on the plant floor, sharing data among makers, end users, third parties, and so forth is complex. One reason is a large percentage of proprietary protocols, which hinder interoperability

The challenges are clear to our European survey respondents. In their eyes, the No. 1 downside of services is greater dependency on third parties (32 percent), followed by complexity in product / service lifecycle management (30 percent) and difficulty in delivering services profitably (26 percent). In fighting a “two-front war” on both the product and service fronts, manufacturers will need to operate and share data across an expanded ecosystem of partners, third-party vendors, and so forth. Especially in Europe, many manufacturers are small and medium-sized enterprises that lack some of the broader digital capabilities that will be critical moving forward [22]. Partners and collaborators will assume an increasing role in solving the complexity.

Digital operating models provide more options when moving to an as-a-service model. These models require fundamental capabilities (analytics, compute at the edge, infrastructure/software/cloud) that allow organizations to continue evolving.

When we asked European end users and machine builders which technologies will have the greatest impact on production over the next three years, they cited digital capabilities such as cloud,

analytics, and machine-to-machine (M2M) communications. As with our global totals, this is notable because of what respondents did not emphasize: “manufacturing” technologies such as robotics, 3D printing, and so forth. This underscores the pivotal role of digitization in manufacturing’s evolution, especially as connecting across an entire ecosystem—not just the plant floor—becomes essential.

To further explore the impacts of digitization on capturing service value, we focused on one key manufacturing use case: connected machines on the plant floor. Connected machines can come in several different forms—devices monitored in-house, devices monitored by a third party, or a new concept: “machine-as-a-service” (MaaS), in which the end-user manufacturer (that is, the customer) pays for a business outcome (for example, better uptime, improved production efficiency) as an operating expense, rather than buying a physical machine as a capital investment.

Predictive maintenance is a critical application enabled by connected machines and data analytics. It allows workforces to maintain the machines that need their attention most, anticipating breakdowns before they cause downtime.[23] In an industry in which original equipment effectiveness (OEE) metrics typically hover around 60 percent, such improvements promise true competitive differentiation.[24]

End-user manufacturers with access to predictive maintenance via connected machines highlighted the importance of digital technologies in maintaining uptime. Nevertheless, Europe lags behind global competitors once again.

Clearly, European manufacturers are interested in exploring use cases such as connected machines, but they also struggle with navigating operational complexities to capture value from services. Moreover, they risk being outpaced by global competitors that adapt and innovate faster.

To alleviate complexities such as the “two-front war,” organizational silos, and a broader ecosystem of partners and third-party vendors, manufacturers must build a solid technology and business-process foundation. As long as the

foundation is solid, they will have the flexibility to re-engineer their business based on digital capabilities and business models, as they extend their solutions beyond the plant floor across an extended ecosystem.

For many European manufacturing leaders, budgets are flat and additional technology investments can appear daunting. Digital transformation, however, requires a “save to invest” strategy. Increases in plant uptime, business agility, and customer engagement will offset initial costs. For example, Cisco research on enabling digital architectures found that such investments would drive 20 percent savings on IT costs, which could be deployed elsewhere in the business.[25] As we have seen in this study, an average digital manufacturer can drive a 12.8 percent profit gain projected over three years. The real cost is in not transforming.

Digital business transformation will enable manufacturers to:

- **Build a Hyperaware Organization:** To implement competitive new business models, manufacturers will need agile IT architectures, hyperaware analytics, and overall business agility. That is, if they are to respond to customers and end users in real time, while ensuring quality and uptime with unprecedented standards of excellence. Security must be built-in at every step, across the entire network, not simply added piecemeal on an app-by-app basis.

- **Make Informed Decisions:** Manufacturers need to treat analytics as a core capability. All of that data generated by new connections will need to be transformed into insight.<sup>26</sup> Manufacturers need to move from making machines to generating value by gaining insights from data. In the digital age, no one goes it alone. Data insights will need to be shared securely across an expanding ecosystem of partners, customers, and third-party vendors. Manufacturers will need a new model to orchestrate that dynamic ecosystem and derive insights from data mined from far-flung sources. This will require foundational business and IT capabilities. In short, if manufacturers don’t first transform, they will fall far short in their efforts to become innovative, agile ecosystem players.

- **Execute Fast:** The process of changing business models is a highly complex endeavor that cannot be achieved by facing these challenges on a piecemeal basis. Industrial machine builder and end-user manufacturer leaders will need to shift perspective from building an organization known only for reliability to that of an organization—underpinned by data analytics—that is known for its speed and agility.<sup>27</sup> Each firm will need the business process and technology foundation to drive business agility; this will in turn enable innovation and business-model change while breaking down silos between IT/OT and engineering/services. Organizationwide digital business transformation—powered by the right technology foundation—will enable the speed and business agility that allow firms to meet these challenges and outpace their competition.

### **Conclusions and perspectives for further research**

Without looking at the service transition through the lens of digital business transformation, the efforts of manufacturers in this area will continue to falter. Technology change is critical, but it must be undertaken in concert with organizational change. That demands consistent policy and company culture, driven by top-down leadership from the C-suite and the board of directors.<sup>28</sup>

Organizations that transform will experience a new era of innovation, with concrete gains in uptime, safety, energy savings, and customer engagement. By driving organization-wide digital business transformation, the winners will leave the service dilemma—and their competitors—behind.

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## MANAGEMENT REPORTING OF THE ENTERPRISE: CONTENT CHARACTERISTICS AND SPECIFIC NATURE OF ITS FORMATION

**Abstract.** The necessity of management reporting formation by the enterprise with the purpose of providing efficient administrative decisions to increase its competitiveness and achieve strategic goals is examined and substantiated. The basic problems of management reporting formation by the enterprise, which are connected: with the complexity of gathering, substantiation, storage and processing of data are singled out; incomprehensibility of the formation procedure and purpose of the reports, as well as the contradiction and lack of data integrity; insufficient analytical processing of information to support the strategic and operational management decision-making; lack of qualified specialists in the interpretation of management reporting, its analysis and responsibility for management decision-making. The influence of resource provision (financial, informational, methodological, organizational and technical) on the qualitative characteristics of the management reporting system is researched. The possible advantages and disadvantages of management system formation of the enterprise are identified and summarized. The expediency of management reporting formation in accordance with the level of enterprise governance in the context of three generalized types is substantiated: strategic – is provided to top managers during the reporting period or on request; tactical – is provided to linear managers with the appropriate periodicity of the output, operational – is provided to specialists daily or in the current time. It is determined that the combination of reporting under IFRS and management reporting in a single information system will increase the efficiency of the management decisions made on its basis. The conclusions emphasize the need to develop relevant sectoral methodological recommendations, the definition of a targeted methodology for management reporting formation and the establishment of its indicative indicators.

**Key words:** management accounting, management reporting, types of management reporting, management reporting system, format of management reporting.

### Articulation of the issue and its relation with important scientific or practical tasks

In the recessionary conditions of the domestic economic system functioning, the important task of the overwhelming majority of enterprises is to preserve existing positions in one or another segment of the market and to provide sufficient conditions for the continuation of their own existence. For accomplishing these tasks, the management of the enterprise needs adequate information and analytical support for system functioning, which would enable in the current time to decide on its further activities. In stable economic conditions, an important part in the formation of appropriate management decisions has been assigned to the analysis and evaluation of public financial reporting indicators. However, the integral dynamism and difficult predictability of the development of economic processes at both the micro-and macro-levels has necessitated the revision of the traditional sources of information and analytical support used by economic entities.

The search for alternative sources of information that, with a high degree of reliability, allows determining the existing prospects and possible risks in the enterprise activity due to the fact that the information formed in the financial reporting system does not correspond to real information requests of the user's internal to the

enterprise. Many Ukrainian and foreign scholars adhere to this position, in particular, the article [1] by a group of authors I. Yo. Yaremko, L. M. Pylypenko, O. I. Tyvonchuk pointed out that "the modern format of financial reporting, provided by international and national systems of standardization and other imperative documents, does not enable to objectively and fully represent the economic potential of corporations" [1]. This is due to the fact that the format used by the public financial reporting of the enterprise reflects the results of its historical (past) activity, because it uses past (belated) indicators, and not leading development indicators. In such conditions, an important part in the formation of information support for the management decision-making is assigned to internal reporting, which operates both belated and leading indicators, that is an effective means of formal display of internal user information needs.

#### **Analysis of recent research and publications**

In the scientific economic literature, there are a number of theoretic and practical publications devoted to the study of management reporting of the enterprise. In particular, M.V. Koriahin, P.O. Kutzyk [2] showed the role and place of internal management reporting in the information system of the enterprise, highlighted the problems of its development, investigated the principles and made the classification of internal management reporting. In the final statements, scientists analyzed the directions of internal management reporting development at the enterprises. In his article, Yu. P. Zyma [3, p. 152] defined the structure of management reporting according to user types (production director, sales director, finance director, chief executive officer). I. B. Sadovska, K.Ye. Nahirska [4, p. 901] disclosed in detail the qualitative characteristics of management reporting, indicating their level of importance when making management decisions. M. I. Skrypnyk, O. O. Hryhorevska in their study [5] summarized the stages of preparing the reporting and defined positive aspects of their observance. I. A. Slobodniak [6] paid attention to the study of the methodology of management reporting, highlighting the main stages of creating information support for accounting management reporting. L.V. Ivanchenkova, H.O. Tkachuk [7]

provide a detailed characteristics of the enterprise internal reporting and define its structure for the industrial enterprise.

In addition to the theoretical developments relating to the identification of indicators and the creation of management reporting forms, there are also practical developments. In particular, the developers of 1C "Accounting" (Russian program) offer an appropriate software platform for management accounting and management reporting, including, the management report on profits and losses, management balance of income and expenditure budgeting. The construction of management accounting on the basis of technology SAP ERP (German model) of the module "Management accounting and reporting" (CO) is also effective, which gives an opportunity to provide information support for the adoption of optimal solutions at all levels of management, both at the current time and in the long run, in terms of enterprise management levels. Developers of Altus-Vario (Czech program) offer to form management reporting in the following areas, with their further specification: finance, human resources, business, production-resources, assets, dupont (pyramidal analysis), liquidity, expenses, profitability. STORMWARE product business intelligence implementation program Pohoda Business Intelligence has separate modules that can be used for both financial and management reporting. When selecting software for the formation of management reporting, the cost of acquiring and servicing one or another program, which is usually impracticable for small businesses, is critical for most business entities.

Specifically, in order to bring the software closer to the user, the 1C and Altus -Vario developers, fixed differential prices for their customers, taking into account the size of their business, the number of users and system modules, etc. But still, the software for management accounting and management reporting is expensive. In particular, Altus -Vario website [8] provides the following prices for full (accounting and management accounting) software suite: for entrepreneurs in the range of 5000-10000 crowns (\$ 225-450), for small and medium-sized enterprises with a number of users up to 10 people – 15 000-250 000 crowns (\$ 675-11 200), for big

enterprises - 200,000 to 2 000000 crowns (\$ 8970-89 700). Taking into account the considerable cost of software offered in the market of software products for the formation of management reporting, the domestic business entities are using their own resource support, independently developing a system of management accounting and reporting.

While studying management reporting, the scientists use different terminology apparatus in their works: "management reporting" [3,4,9], "internal accounting" [7], "internal reporting", "accounting management reporting" [6], "internal management reporting" [2, p. 205], "reporting for managers", "immediate reporting". Despite the differences in the use of terms that characterize management reporting, scientists believe that it is a kind of reporting aimed at supporting the management decision-making and therefore affects the quality and efficiency of management decisions. In the study, the term "management reporting" is used as it most reveals the specifics and purpose of the category under study.

**The aim of the article** is to substantiate the feasibility of management reporting formation by domestic enterprises and to determine the specifics of its preparation.

#### **Presentation of the main material**

The rapid development of information technology, the changing market conditions and increased competition led to the emergence of tasks for the enterprises to improve the efficiency of management, which is based on improving the quality, efficiency and reasonability of management decision-making. In particular, in the process of management decision-making that is related to the ongoing enterprise activity and planning of the strategic activity of the enterprise, managers use different types of information. Among the types of information and analytical support in the formation and preparation of management decisions, the reporting formed in the system of management accounting is of great importance.

The absence of legislative regulations on the formation of management reporting enables the enterprise to determine, in its sole discretion, the

format of internal management reporting. Despite certain segmental theoretical and practical developments concerning the formation of management reporting, this problem remains practical for domestic enterprises. Some effective developments concerning the formation of a management accounting system are at large domestic enterprises, but they are mainly reduced to sectoral developments in the formation of management reporting. In particular, some industrial enterprises have developed and apply in practice separate fragmentary data of management reporting on customer base analysis –by the marketing department, in relation to the analysis of cash flows – economic planning and financial departments, cost of production - production department, accounting department, etc. However, there are almost no systemic developments concerning the creation of a holistic mechanism for the formation of management reporting, with the specification of the relevant indicative indicators. Despite the lack of legislative requirements for the formation of management reporting, most of the strategically important economic entities form their own management services, the purpose of which is mainly to form high-quality information and analytical support to maintain management decision-making.

A significant number of enterprises, irrespective of their scale of activity (big, medium, small), have encountered a number of problems in preparing management reporting stipulated by: the complexity of collection, justification, storage and processing of data; lack of clarity in the order of formation and designed purpose of the reports, as well as the contradiction and lack of data integrity; insufficient analytical processing of information to support the strategic and immediate management decision-making; lack of specialists in the interpretation of management reporting, its analysis and responsibility for management decision-making. An important factor in influencing the formation of a management reporting system is the inadequacy or loss of productivity of software systems and the high cost of their acquisition, maintenance and operation, as well as a number of other factors that reduce the quality of data analysis and end-user satisfaction.

At the same time, integrated practical

achievements are effective in relation to the formation of management reporting in multinational companies, which involves a large number of highly trained staff in the preparation of internal management reporting. However, the own systems of management accounting for multinational companies are not made public, as they reflect the specifics of their activities and are commercially sensitive.

As for representatives of medium and small businesses, because of the absence of sufficient resources (human and financial), most of them lack integral management accounting systems; therefore, for such enterprises, in order to ensure their adaptation to difficult predicted environment conditions, it is necessary to develop a common methodology of management reporting formation.

The absence of clear regulation of management reporting, on the one hand, opens up a lot of prospects for enterprises, which make it possible, at their own discretion, to form a system of management accounting and reporting, taking into account their sectoral and individual characteristics. On the other hand, the absence of relevant sectoral recommendations does not allow for the identification of indicative indicators of management reporting.

Forming a system of management accounting and reporting at the enterprise, along with financial aspects, which are usually crucial for enterprises, in relation to the choice of how to create management reports (the purchase of special software from external suppliers, the development of a system of management reporting by the enterprise), or the delay in the formation of management reporting for an indefinite period. In addition to the financial component of the resource support of the management reporting formation by the enterprises, other types of support (Figure 1) are taken into account, considering the possible efficiency of management decisions made on the basis of management reporting.

Figure 1 illustrates the main types of resource support: information, financial, organizational and technical, methodical, which are interrelated and affect the formation of management accounting and reporting. Usually, the better the resource support, the greater the probability of a high-quality management

accounting and reporting system. All types of resource support for the formation of management accounting and reporting are important since by combining in one or another relationship, they create the initial conditions for the formation and further operation of the management reporting system at a particular enterprise. Therefore, it is necessary to take into account the impact of each type of resource support, because its sufficiency is individual for a particular enterprise and influences the quality of the management reporting system, formed with the help of resource support, of the same enterprise. The value of the components of resource support is unique, and not always its direct transfer in the formation of the management accounting and reporting system to another enterprise will lead to the desired results.

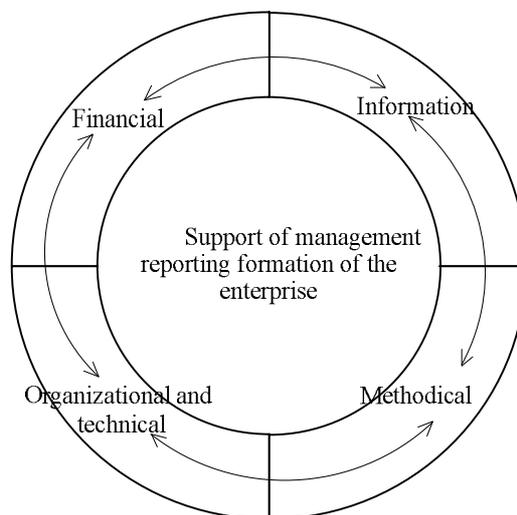


Fig. 1. The main types of resource support for the formation of management accounting and reporting, their interrelation

Taking into account the fact that in most thematic articles, researchers consider management reporting as a system of appropriately grouped indicators, therefore the basic platform of the production system of internal reporting is presented in Fig. 2.

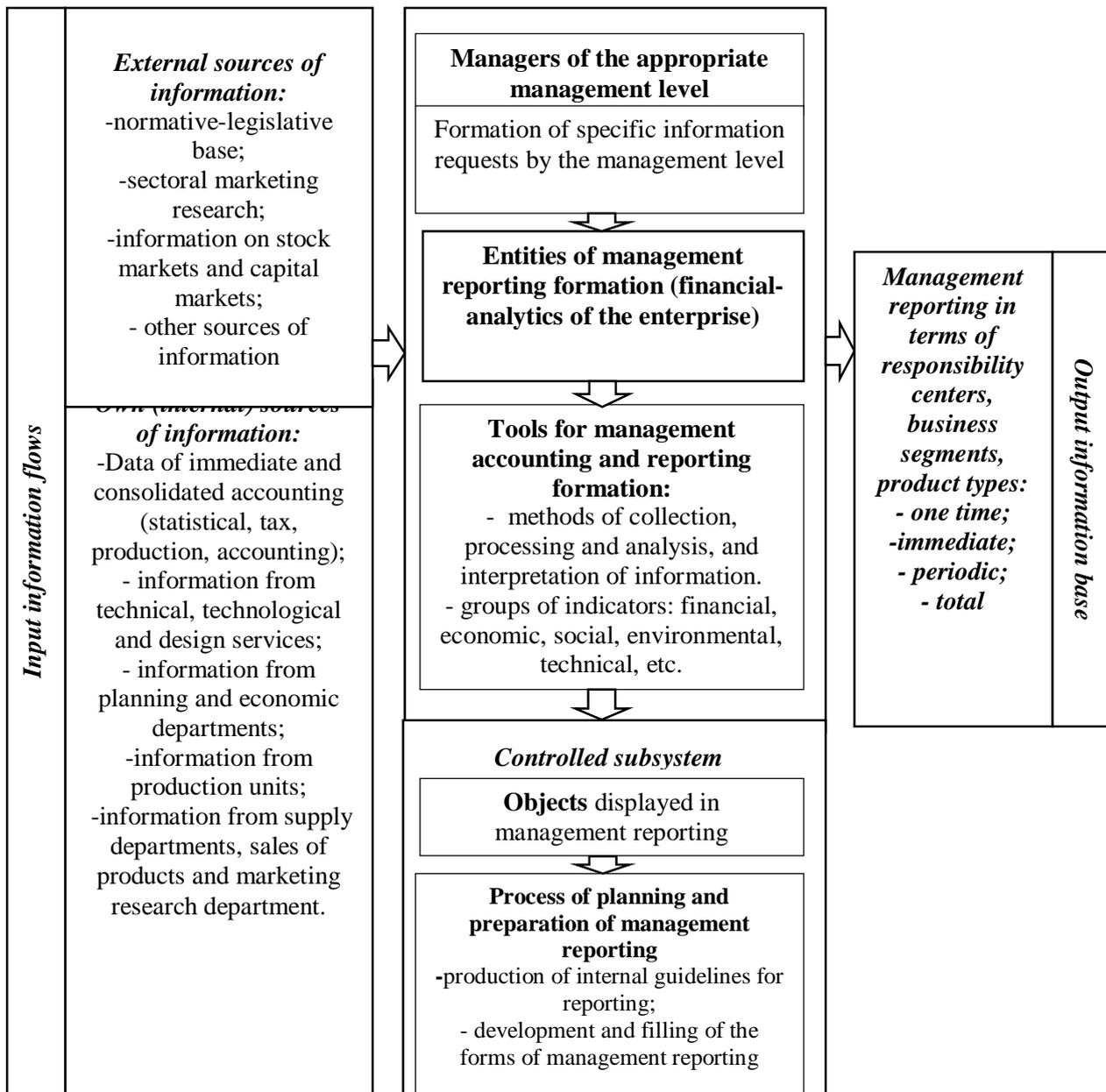
Fig. 2. illustrates the information on the input of the system, which is the basis for the formation of management reporting and in a certain way is transformed, based on the use of appropriate tools in the management reporting system. When forming a system of management reporting at an enterprise, it is reasonable to take into account the

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following main components that will decisively influence the quality of management reports:

- basic principles of the management reporting formation (the flexibility of reports, the clarity of the content, accessibility for a certain circle of users, etc.);
- users, taking into account the hierarchical subordination (managers of senior, middle and lower levels of management);
- types and forms of management reports, taking into account the needs and requests of users;

- structure of the reports and their visualization (presentation in a clear and convenient form for the user);
- information sources for the management reporting formation (internal (current accountancy data), external (specialized analytical studies), etc.);
- relevant tools (methods of collection, processing and presentation of information) for the preparation and formation of management reporting;
- regularity of formation (decade, month, quarter), case studies (one-time nature).



*Fig. 2 Information system for the production of management reporting of the enterprise*

Along with the existing advantages, there are disadvantages in the formation of a management reporting system at the enterprise, which not only does not help in making management decisions but also can negatively influence the management of the entity. The main disadvantages of the management reporting system are clearly marked by I. B. Sadovsky, K.Ye. Nahirska "Excessive saturation of management reporting with accounting and analytical information, the use of too complicated calculation methods, the pressure of non-financial data does not always lead to the efficient management decision-making" [4, p. 899].

The procedure mistake of most enterprises is that they initially create a management accounting system, and then form management reporting. When forming management reporting, managers of the enterprise need to rely on the expected strategic objectives and indicative indicators, which determine the efficiency of the enterprise. Based on this procedure, to determine the list of forms and structure of management reports, adjusting the existing system of management accounting for the management needs of management decision-making. Therefore, it is reasonable to group the strategic objectives by the perspective of their implementation, to establish causal relationships between the objectives, to form indicative indicators that will determine their implementation in accordance with the objectives. Each indicative indicator should have a scope of implementation and assigned purpose, besides, when constructing a management accounting system, it should be taken into account that the enterprise uses not only quantitative but also qualitative indicators for the management reporting formation.

Implementing the strategy, the enterprises face the urgent need to formulate indicative indicators and determine the model of information support to be implemented at the enterprise, taking into account the type of its activity, sectoral specificity, and to be used to achieve the relevant objectives: financial management, budgeting, business process management, personnel management, project management, etc. The applicable information model of the enterprise management should be comprehensive, using indicative indicators of management reporting as an integral and structured characteristics of the

enterprise efficiency. As an immediate and reliable evaluation of the enterprise efficiency is performed considering the achievement of the established strategic objectives, the main instrument for the formation of management reports is the use of a system of indicative indicators established for monitoring and control of objective achievement.

Considering the fact that management accounting includes three interrelated levels of management, depending on the level of enterprise management, the management reporting information presented to the managers can be of the following three generalized types:

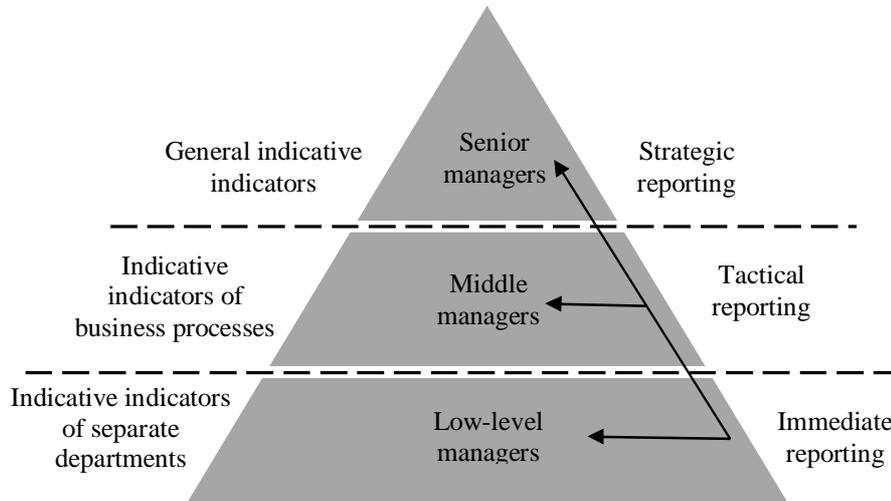
- strategic – is provided to senior management during the reporting period (week, decade, month, quarter), daily (immediate information) or on request (if there is a certain need for solving the problem);
- tactical - is provided to linear managers with the periodicity of output,
- immediate- provided to specialists/managers daily or at the current time.

The number of management reporting information and its orientation should take into account the addressee, his requests and the need for such data. In order to avoid saturation with unnecessary information, it is necessary to consolidate the data in the planning process related to the requests of the recipients. In general, the level of transmitted data unification increases with each hierarchical management level and the level of responsibility. In the context of information support for managers of different levels of management, the transfer of information to senior managers focuses only on the necessary, monitored information. Detailed information is reserved for the middle and lower levels of enterprise management. According to the levels of enterprise management, it is reasonable to form management reporting in their context according to the following indicative indicators:

- general indicative indicators characterizing the business efficiency as a whole (chairman of the board - chief executive officer - financial director) - strategic reporting;
- indicative indicators characterizing the efficiency of individual business processes of the enterprise (vice president-deputy chief executive officer-unit managers) - tactical reporting;

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- indicative indicators characterizing the effectiveness of individual departments (department managers, groups, etc.) – immediate reporting. (Fig. 3).



*Fig. 3 Pyramid of the formation and use hierarchy of enterprise management reporting*

The management reporting system is based on the hierarchy of management levels (Figure 3) and provides a high-quality, reliable exchange of information among the functional units and support for the process of management decision-making. Based on the existing management, financial reports and primary documents, managers of the enterprises should monitor both operational (local, tactical), as well as strategic indicators of the enterprise, as well as to promptly inform responsible employees about deviation from the planned (target) indicators.

The introduction of indicative indicators in the system of management reporting enables to ensure high efficiency of the responsibility centers, setting the minimum, boundary, normative values of the accepted indicative indicators. The value of indicative indicators is determined taking into account the strategic goals of managers, the development of individual business areas. The system of indicative indicators can assume the hierarchical structure, both for the enterprise as a whole and with the specification to each responsibility center. Depending on the size of the enterprise, the clarity of the organizational structure, the development of document flow, the establishment of accounting work and the automation degree, the work at the enterprise can be coordinated by one employee or a separate department.

In this case, the use of effective software, based on indicative indicators, allows for parametric, multidimensional analysis, as well as the ability to interactively update the indicators by

any analytical breakdown, constructing analytical reports and the possibility of implementing various filters according to the tasks, predictive modeling, horizontal, vertical, retrospective, and other types of data analysis, etc.

As a methodological basis for the formation of its own management reporting system, a significant number of multi-branch enterprises has begun to actively use the standards of IFRS (at least some of them). In particular, this is mainly due to the fact that the declared principles and tasks of IFRS most correspond to the principles and objectives of management accounting. At the same time, the requirements of IFRS for the accounting procedure and reporting format used are more flexible than the requirements of S(S)AP. Therefore, as the basis for the preparation of management reporting, enterprises can use indicative indicators formed in accordance with IFRS, which will improve its quality due to the "uniform" approach to reflecting all economic events, regardless of their nature.

As practice shows, in conditions of the uncertainty of the external environment of operation, enterprises have several types of accounting (management, business, tax, accounting according to international standards), with both tangential and distinctive components. In particular, there are some differences in the use of indicators (their numbers and calculation method) when forming management reports and reports prepared under IFRS; therefore, the question now

arises of the appropriateness of management reporting formation. Some enterprises in such cases combine IFRS reporting and management reporting into a single information system. However, it should be noted that management accounting can be the source of primary accounting only when all the original documents of management accounting are formed according to accounting standards. We believe that in this case, it is necessary to increase the specification and substantiation of the information for the purposes of management accounting by developing new forms of primary documents, the information use of which will simplify the process of management reporting formation, and to reduce the number of operations in preparing reports according to the international standards. As a result, the accuracy of the information provided will increase, which will avoid divergence of the provided information in time; an increase of control over the results of each responsibility center; simplify the formation of different types of reporting; reduce potential conflicts between managers at different levels of management, etc. Only the application of common standards, principles for the consolidation and formation of international and management reporting will allow enterprises to substantially minimize costs, and management - to more effectively organize the accounting process.

#### **Conclusions and perspectives for further research**

Consequently, in the conditions of the imbalance of the domestic economic system, in order to provide favourable conditions for the enterprise operation, its management has a strong interest in the management reporting formation, the information use of which will enable to make more balanced (supported by appropriate analytical data and calculations) management decisions. Therefore, at the legislative level, it would be reasonable to develop appropriate sectoral methodological recommendations, outline the indicative methodology for the management reporting formation, and define its main indicative indicators. At the same time, it should be noted that at each enterprise, the methodology for the management reporting formation will have individual characteristics, predominantly determined by the used technology and features of production and economic activity. Also, management reporting of the enterprise should have a definite structure and an

appropriate level of specification in the reports, then it will be an effective tool for implementing the strategy of the enterprise, contributing to the increase of its competitiveness.

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## HYBRID DEVELOPMENT OF MODERN ENTERPRISES

**Abstract.** Long-term effective development of enterprises in the modern dynamic conditions, as a rule, provides the use of certain variants of integration or diversification growth. However, as research shows, in many cases it is advisable to choose a hybrid variant of such growth due to the formation of business structures by combining concrete business units of several enterprises. At the same time, enterprises whose business units are involved in the formation of hybrid structures can continue their normal functioning with other own business units, using the residual capabilities of business units that are part of the hybrid structure. With the help of comparative analysis, generalization and system approach in the work, variants of hybrid growth are highlighted and one of them is described for the tourist industry. The efficiency of the ski resort with the use of concentric growth strategies, concentric and conglomerate diversification, and hybrid growth are calculated. The results confirmed the effectiveness of hybrid growth for enterprises with insufficient financial resources and strategic opportunities and successful enterprises by integrating certain business units of one enterprise with specialized business units of other enterprises. The difficulties of using hybrid growth variants for enterprises of other industries are determined and recommendations for their solution are given.

**Key words:** diversification; integration; hybrid growth; business unit; strategy.

### Formulation of the problem

One of the most effective ways of modern enterprise activity is diversified or integration growth, which ultimately provides a successful long-term development of the enterprise. At the same time, diversified growth is ensured by the

formation of effective measures of competition in a certain market through the release of a new non-traditional technology, marketing or consumer product position, and integration - by establishing the best options for cooperation with suppliers, consumers, intermediaries, competitors, other subjects of management.

However, one-way orientation of the enterprise into one of the above-mentioned directions can lead to its destruction in the long run due to:

- strict competition, which, in addition to significant costs, can help to unite competitors against the company in order to withdraw it from the market;
- orientation towards unification, which may lead to dependence and control from enterprises with which cooperation is established;
- the presence of enterprises at different stages of development with significantly different financial, marketing, innovation opportunities, etc.

In addition, not all enterprises can apply these development options. For example, an expedient development direction for a company with weak financial resources is the reduction of production, and for a company that is in a stage of decline in the life cycle - liquidation or restructuring.

Therefore, an important point is the need for a rational and timely solution to the question: when and where to compete, and when to cooperate, so that it would be beneficial to all interacting sub-entities of the economy irrespective of their financial status, developmental possibilities and life-cycle stage. There is a need to introduce a development option that would combine the

features of each of the above approaches. That is, the question is about the formation of hybrid variants of development, which would ensure the establishment of a rational balance between competition and cooperation.

### **The recent investigations and publications**

The scientific literature describes widely the variants of diversification and forms of integration of enterprise activity [1-12]. Diversification is a common form of development of foreign and some domestic enterprises. Of particular relevance is the diversification of enterprises with the allocation of business units according to certain classification characteristics and their subsequent successful long-term functioning by finding opportunities for optimal and effective interaction between them. The results of research [13] confirm that the operation of business units in the form of business units brings far more effect than their individual management. In particular, the effectiveness of our proposed division of the Zakhar Berkoot Resort is not only on the business unit (BU), but also on the strategic business units (SBUs), helping (HBU) and providing (PBU) business units, is confirmed by positive results. Its functioning as an integral unit due to the formed synergy effect. However, diversification requires significant spending to form strategic development opportunities, which can be achieved with reduced costs by combining with other enterprises or their business units. Therefore, the question of finding ways to combine the possibilities of integration and diversification growth, to create possible effective hybrid directions for enterprise development, requires detailed research.

### **Statement of purpose**

The goal of the research is to create options for hybrid growth of enterprises based on the benefits of diversification and integration of their business units.

### **Description of the main study material and the results**

Taking into account the peculiarities of the division of enterprises in the SBU, HBU and PBU [14, 15], as well as the conditions and forms of integrated growth, the proposed variants of hybrid growth are presented in Fig. 1.

According to the first variant of the hybrid growth of enterprises 1, 2 and 3 are divided into SBU, HBU and PBU. For further operation, they can unite in one company, whose effective operation will be provided only by certain business units of all three

enterprises. The presence of one integrated enterprise, the rest of the business units of units of all interacting enterprises, will incur unnecessary costs. That is, the performance of all three enterprises in the form of business units with the formation of a hybrid structure will be more productive, by combining the SBU of one enterprise with the HBU and the PBU of others. In this case, the PBU and HBU of the parent company may be stored, and the activities of some of them may be reduced.

Considered variants of hybrid growth (Fig. 1) can be used also in the formation of international clusters, when one of the enterprises 1, 2 or 3 is located in another country.

Each of the variants of the hybrid growth of the company provides him with a certain synergistic effect, which manifests itself in the advantages:

- the general ones that are present for all structural elements of the created hybrid structure (SBU, HBU and PBU) and manifested in reducing or eliminating certain trade barriers, combining and wider use of resources and potentials of two or more enterprises, avoiding competition from partners, the best knowledge of the needs and preferences of local consumers and the requirements and conditions of the functioning of this market, the more effective application of special skills and knowledge, increased differentiation of goods / services, rapid entry into the market, increasing the potential for learning, decision of consumers as domestic producers need less investment;

- specific, namely, for:

- SBU is a low cost due to the use of cheap labor, raw materials, materials, etc.; better quality of products at the expense of manufacturer's specialization; close placement to the manufacturer of products;

- HBU is the emergence of a stable market share; no need to adapt the product to a new market; absence of restrictions on the sale of the offered product (provision of services) in the desired market; insignificant barriers to exit the market through the use of available infrastructure;

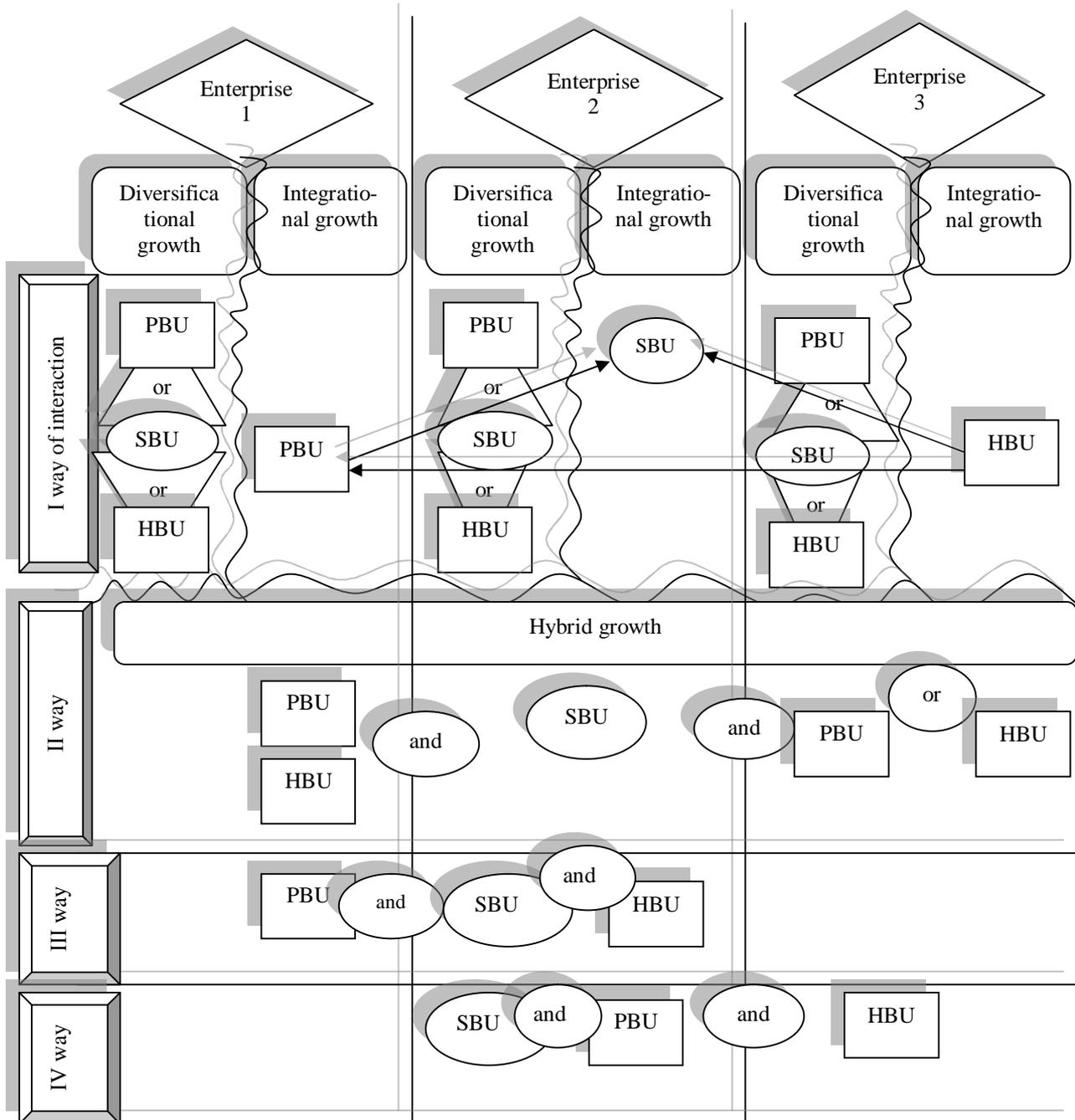
- PBU is the high return on investment.

The best performance of hybrid growth is traced to enterprises of the tourist industry, which is due to the ease of allocation in their composition of SBU, HBU and PBU. Our research on the activities of the Zakhar Berkoot ski resort confirms the efficiency of the allocation of business units at the expense of a synergistic effect. However, in the

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event that the company does not have a sufficient amount of its own financial resources and strategic capabilities, it is difficult or impossible to achieve such a result. Necessary new approaches based on

the above hybrid growth features. For example, you can consider the activities of the resort "Ski Center Polyana" (hereinafter "SCP"), which consists of a hotel and a ski lift.



*Fig. 1. Options for hybrid growth of enterprises [self-design project]*

The division of the resort "Ski Center Polyana" on the SBU "hotel complex" and the "Ski Complex" PBU did not bring the desired results (encouraging a certain number of consumers), although the proposed division allowed outlines directions and variants of hybrid growth. That is, for the development of the existing resort, taking into account the variants of

hybrid growth presented in Fig. 1, it is proposed to use concentric diversification by expanding the spectrum of existing services with new ones with corresponding directions of integration development of the interaction of the own business units of the resort with the structural units of other enterprises (Figure 2).

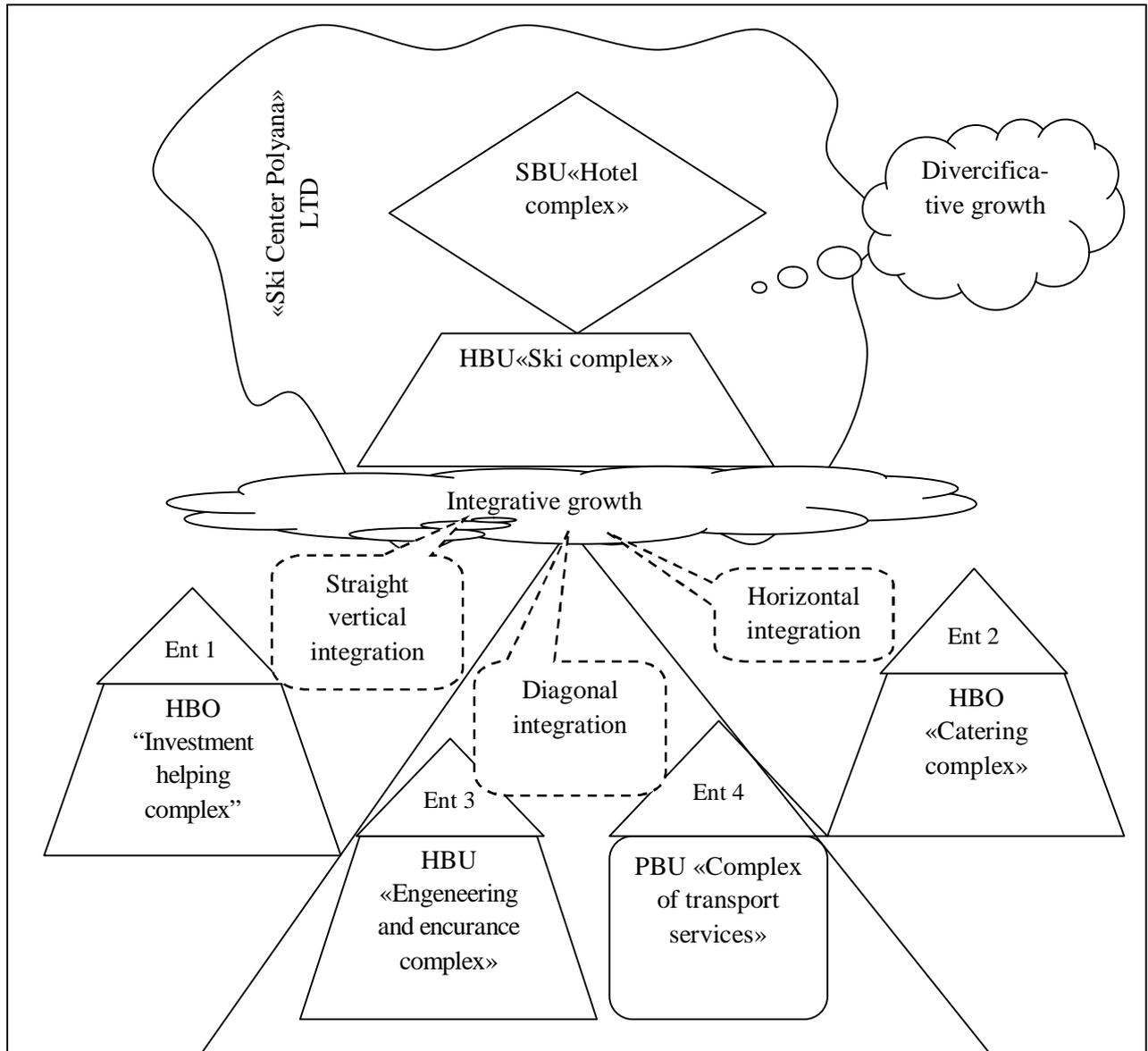


Fig. 2. Option of hybrid growth of "Ski Center Polyana" Ltd [self-design project]

Consequently, it is necessary to combine the researched resort with the following structures:

- Public catering complex (outbound services). This complex will be presented by small traders who will sell their products near the ski lifts and descents of the resort and only with the permission of the management. This facility will act as a supportive business unit, as it will not support the activities of the researched resort, will not promote the interest of customers, and will bring only certain cash;

- a complex of transport services (sphere of transport services). The complex will also be presented by a private owner, but it will support the resort's activities, as it will boost consumers and will work mainly to ensure the livelihood of the resort. Therefore, it will act as a unit providing business;

- investment and auxiliary complex. In our case, this will be a supporting business unit and will be a travel agency that will organize recreational and sports entertainment for both adults and children;

- the engineering and insurance complex is represented by a special company, which provides a set of services for the maintenance of engineering networks, transformer substation, life insurance, as well as rescue services. In our case, it will also be a supporting business unit.

Integration strategy is presented in three types: direct vertical integration with travel companies, horizontal integration with retailers and diagonal integration with transportation and rescue organizations.

The effectiveness of selected strategic development directions of "SCP" Ltd. is confirmed by the results obtained from their implementation.

For weight and necessity of realization of the chosen directions in tab. 1 discussed several possible options for the development of the resort "SCP" Ltd. and calculated the possible results of each of them.

Table 1

**Results of realization of selected directions of strategic development of the resortment of a larger amount of investment**

Indexes	The results of "Ski Center Polyana" Ltd. activity				
	Without using of any strategy (2015)	Using the strategy of concentric growth (2016)	Using the strategy of concentric diversification	With the chosen strategy of hybrid growth	Using the strategy of conglomerative diversification
Investment costs, UAH ths.	-	1200	2750,38	2750,38	5175,07
Revenues from the sale of tourist resort services, ths. UAH, in particular:	3456	6532	9144,8	13538,78	15167,82
Revenue from realization of services of the ski complex, ths. UAH.	-	-	5083	7014,54	7014,54
Revenues from the sale of hotel complex services, ths. UAH	-	-	4061,8	6506,24	4879,68
Revenues from the sale of catering services, ths. UAH.	-	-	-	18	2930,37
Revenues from the sale of services of the transport complex, ths. UAH.	-	-	-	(292,27)	145
Revenue from the sale of services of the investment and auxiliary complex, ths. UAH	-	-	-	(227,96)	198,23
Revenue from the sale of engineering and insurance complex services, ths. UAH.	-	-	-	(234,5)	-
Costs of operating activities of the resort, ths. UAH, in particular:	4033	5506,58	5612	6310,43	7380,26
The costs of the ski resort, ths. UAH.	4033	5506,58	1683	2244	2903,38
Costs of the hotel complex, ths. UAH			3929	3368	
Expenses of the complex of public catering, ths. UAH.	-	-	-	-	2200
Expenses of the transport complex, thousand UAH	-	-	-	265,7	206
Expenses of the investment and auxiliary complex, ths. UAH	-	-	-	198,23	98,3
Expenses of engineering and insurance complex, ths. UAH	-	-	-	234,5	65
Profit before taxes, ths. UAH	-577	1025,42	3532,8	7228,35	7787,56
Income tax, ths. UAH	-	184,57	635,9	1301,103	1401,76
Profit after taxes, ths. UAH	577	869	2896,9	5927,25	6385,79

Source: calculated based on data provided by the enterprise

The first option is the activity of the resort of "SCP" Ltd. without the use of any strategy. Just so, the resort functioned until 2016. During this period, his activities were loss-making due to low incomes and high costs, and the management did not invest any funds in the activities of the resort. The ineffective activity of the resort forced the management to review the company's policy, assess its own capabilities and market needs and, on the basis of this, form a new direction for further development.

This direction has been concentric growth, which envisaged improvement of the company by improving and expanding the list of certain types of services, reducing the cost of providing services, etc. It is clear that such measures required certain cash, which the enterprise practically did not have and the management turned to investors. Of course, the use of this strategic direction of development allowed the resort to increase the number of customers, and accordingly, and profits. However, for a long time to stay at this level, due to the diversification of the resort services prevented by competitors, who also actively began searching for ways to reduce the prices of services or to improve and diversify them.

The results of research on the activities of promising domestic and foreign enterprises have confirmed the effectiveness of diversified growth. However, the limited amount of money allowed using only concentric diversification, the essence of which was to focus on their own needs in order to improve the quality of existing services and develop new promising services to create the maximum possible synergy effect. Such synergistic specialization allowed increasing the company's income by 40%, with an increase in costs by only 15%. It is clear that the formation of additional services required the invest.

The application of the hybrid strategy required the same investment as for concentric diversification, since in two cases there were only two business units in the enterprise, and only the quality of services, their list and costs for their implementation changed accordingly. The merger of the resort "SCP" Ltd. with the enterprises and business units of other enterprises strengthened its attractiveness, increased the number of consumers, and, accordingly, the amount of income by 30%

compared with concentric diversified growth. At the same time, the availability of transport services increased the income of the ski resort by 15%, and the hotel - by 10%, the complex of public catering increased incomes of the ski resort by 5%; travel companies provided growth of both business units by 15%, and the engineering and insurance complex by reducing the downtime of the equipment of the resort due to breakage and the availability of rescuers increased revenues and hotel and ski resort by 3%. With a hybrid growth, the catering complex consisted of outlets at the ski lifts, which provided income in the form of a lease. The restaurant in this case belonged to the hotel complex. Identification of a business unit catering complex did not provide a large number of customers and did not bring significant profits, however, allowed to restrict and take control of the work of outlets.

With hybrid growth, the cost of the "SCP" Ltd. remained constant, and additional costs began to pay for services to outsized business units, whose incomes were corresponding to their payments to the resort "SCP" Ltd. But apart from the "SCP" Ltd., enterprises whose business units cooperated with this resort, served several other enterprises, not only the tourism industry. Thus, for example, travel companies that acted for the "SCP" Ltd. as a "investment and auxiliary complex" were receiving money from the resort, and for its part provided its activities to a certain number of clients. The very successful proposal was the formation of children's groups for sporting and recreational activities. Adoption of a group of children allowed the resort and available children's rooms and playgrounds, as well as attached multi-lifts and equipped with a walk-in closet. Of course, the inflow of customers increased the volume of services and hotel, and bugles, and transport. We did not include incomes of affiliated business units in the total income of the resort, since these are personal revenues of these structures, which consist of two parts - payments by the Ski Center Polyana Ltd. for services rendered plus 10% for the transport complex and 15% for travel companies that they earned an accompanying rendering of a resort service (the size of their profits for clarity is given in round brackets).

The cost of applying this strategy and the amount of profit may vary, respectively, in the direction of reduction and increase by establishing the most effective options for enhancing some business units at the expense of others. Such profitability requires for a longer period of research.

In addition to the hybrid growth strategy as an option for effective long-term development of the resort (which was used by the Zakhar Berkoot spa resort), Table 1 shows the indicators of conglomerate diversification, which involves replenishing the company's range of products that are not related to either the technology used or the the markets in which the firm operates, or with the existing needs of consumers. The strategy of conglomerate diversification is considered for comparison, if all integration business units were present at the studied resort.

However, at the moment, the practical use of this strategic alternative is not feasible due to lack of funds. It is clear that conglomerate diversification requires a much larger amount of investment, due to the creation of infrastructure and the purchase or construction of objects of the proposed business units (purchase of transport, opening an office for a tour of the company, etc.). With conglomerate diversification, hotel revenues would fall by 25% because restaurant services with self-generated outbound points of sale would be part of a catering complex. In this case, the revenues of the transport complex would be 10% higher due to the fact that we would independently provide these services and, accordingly, would more clearly indicate the number of all passengers transported. In the minus left only the engineering and insurance complex, which is connected with the use of services of specialized rescue and security companies. It is clear that the effectiveness of the conglomerate development option can be much higher than the hybrid variant if it is true to form and realize a synergistic effect. However, with a low financial position and an overly threatening external environment, the implementation of the conglomerate diversification option is too risky and usually costly due to the need to attract a large amount of investment.

Consequently, a hybrid strategy is effective in an unattractive or critical financial condition, but the available opportunities (marketing, innovation,

personnel, etc.) continue to grow. In addition, as can be seen from Table. the obtained results of the implementation of the hybrid variant of development at the enterprise are not very different from the results of conglomerate diversification. Of course, by improving its activity due to hybrid growth, the resort may gradually create some business units on its own, but it is expedient to attract from the side specialized services on certain services with high quality, low cost, variety of assortment, etc. business unit for effective long-term growth.

It will be more complicated to use hybrid growth options for enterprises that are difficult to clearly distinguish between SBUs, HBUs and PBUs. In this case, a closer examination of the need for a clearer definition of the critical points of contact between business units of different enterprises, determination of the time of termination of own production and association with specialized enterprises or their business units, etc., are needed. The best way to establish links between the allocated SBU, HBU and PBU of different enterprises will be through the relationship between universally allocated for all businesses business processes of specific business units and their respective components.

### **Conclusions and perspectives of further research**

The conducted studies allowed us to conclude that:

- From the theoretical point of view, the hybrid growth strategy can be used by all enterprises, regardless of their strategic capabilities and development stages, without contradictions and dependencies from other enterprises by establishing a rational balance between competition and cooperation. This variant of development is based on the peculiarities of diversification and integration growth with the formation of the appropriate variants of interaction of specific business units of different enterprises;

- From a practical point of view, the hybrid growth option is effective because of the possibility of its use for enterprises without significant financial resources in order to: rapidly and stably increase the corresponding strategic capabilities by specializing in certain business units; rapid balance

of the enterprise portfolio, which involves the involvement of business units at the appropriate stage of the life cycle; effective entry into international markets, where products will be treated as national ones, etc.

Consideration of the possibilities and difficulties of using hybrid growth options for enterprises of different ownership forms of all industries has allowed to outline the prospects for further research in the direction of the formation of methodological provisions for the allocation of critical points of contact between business units of different enterprises, by their division into universal constituent elements (business processes).

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## REMARKS CONCERNING METHODOLOGY IMPROVEMENT FOR INTEGRAL ASSESSMENT OF A COMPANY'S INVESTMENT ATTRACTIVENESS

**Abstract.** The article deals with the issues of the estimation company's investment attractiveness. The features of the integral index formation of investment attractiveness are studied. Critical assessment of the meaningful content of a group of indicators that form an integral indicator of investment attractiveness has been made. An improved set of indicators was proposed by the authors in order to modernize the existing mechanism of integrated assessment, approved by the Agency for the Prevention of Bankruptcy of Enterprises and Organizations. This will help to improve the criterion assessment of the investment attractiveness of an enterprise as an instrument for obtaining objective information for an investor regarding an investment object.

**Keywords:** investment attractiveness of enterprises, integrated assessment of investment attractiveness, company property status, financial stability, profitability, assets liquidity, business activity, market activity.

### Formulation of the problem

Investment is an important engine for the development of any business. By the term "investment" it means investing (spending) resources in order to generate income in the future. Investors are always interested in the financial state of the enterprise like the object of investment. The question of the unbiased assessment of the enterprise's financial condition, the available resource potential, the potential for future development and the generation of expected income and profit is relevant for both the external

investor and the enterprise itself. Inaccuracies in the calculation methodology lead to their distortion, incorrect assessment of the financial condition of the enterprise, and, accordingly, decisions taken on their basis by investors become ineffective. Existing scientific and methodological developments are characterized by the absence of the unified system approach to assessment the company's investment attractiveness, and often do not fully reflect the aspects that are the greatest interest to the investor.

Successful operation of the economic system of any country is connected with the continuous capital infusion (financial, material, intellectual and innovative, etc.) In other ways of saying, the development of the country's economy requires constant investments, both foreign and domestic. Investment activity in Ukraine has slowed down today.

The reasons of investments' slowdown in domestic enterprises can be combined into two groups - internal and external. External reasons include political instability, military actions in the east of the country, corruption, etc. Internal factors are the quality of management, material and personnel support of the enterprise, policy on debtors, depreciation, price, dividend, innovation policy, etc.

The combination of the influence of all factors on the activity of the enterprise is reflected in its financial state and the final results. Therefore,

in order to estimate the investment attractiveness of an enterprise it is expedient to use one integral indicator, which is formed from a set of indicators characterizing various aspects of enterprise's functioning.

### **Analysis of recent research and publications**

Theoretical and methodological features of company's investment attractiveness estimation are considered in the works of domestic and foreign scientists. The following Ukrainian scientists contributed significantly to the study of this issue: L. Lakhtionova, E. Mnikh, G. Savicka, Y. Tsal-Tsalko, I. Blank, M. Korobov, L. Kovalenko, A. Zagorodniy, A. Podderijhin and others.; also foreign scholars: D. Van Horn, D. Bachovich, D. Schima and D. Siegel, J. Richard, E. Helfert E. Brygham and others. Despite the large number of scientific developments, there is a need for methodological support of theoretical developments in practical activities.

**The purpose of the article** is to improve the calculation methodology for the integral indicator of enterprise investment attractiveness in terms of forming a set of indicators that will fully reflect the various stages of enterprise's operation.

### **Material and results**

At the state level, a number of laws were adopted to provide a favorable investment climate for both domestic and foreign investors. State regulation of investment activity is determined by the Laws of Ukraine "On Procedure for Foreign Investments", "On Protection of Foreign Investment in Ukraine", "On Investment Activities", "On Amendments to Certain Legislative Acts of Ukraine on the promotion of foreign investments and loans" and a number of resolutions, laws, instructions, etc. The institutional support of investment activity at the state level is realized through the State Agency for Investment and Management of National Projects functioning.

In addition to the assessment of the environment, the investor estimates the investment object. By formation portfolio of investment objects, the assessment of their investment attractiveness is carried out on the basis of the Order of the Ministry of Justice of Ukraine (further

on the text – Order) No. 22 of February 23, 1998 "On Approval of the Methodology for Integrated Assessment of Investment Attractiveness of Enterprises and Organizations".

According to the proposed methodology for estimating the enterprise investment attractiveness, an integral indicator of investment attractiveness is calculated, which combines over 40 financial indicators [1]. As stated in the Order, "integral estimation of investment attractiveness is the indicator in which the values of other indicators, adjusted in accordance with their importance and other factors, are reproduced".

Calculation and use of the integral indicator of investment attractiveness are justified, as "it allows to combine in one indicator many of factors that are different by names, units of measure, weight and other characteristics". The use of integrated assessment is widely applied in foreign and domestic practice as it "simplifies the procedure for evaluating a particular investment proposal, and sometimes it is the only possible option for its implementation and providing objective final conclusions" [1].

The qualitative characteristics of the calculated indicator, and, accordingly, the efficiency of the decisions taken, depends on a set of indicators that form the indicator of the integrated assessment of investment attractiveness. The indicators proposed in the Methodology are arranged into six groups (Figure 1). In our opinion, it is important for a set of indicators, that are taken into account in the calculation of the integral indicator, to reflect the financial and property position of the investment object most accurately and objectively.

According to the Methodology, we will consider and analyze the groups of indicators used to calculate the integral estimate of the enterprise investment attractiveness.

Thus, a group of indicators, that assesses the property status of the invested object, includes such indicators:

- an active part of fixed assets;
- depreciation;
- renewal and disposal of fixed assets.

However, the proposed indicators do not reflect the qualitative composition of the enterprise's property and its renewal by modern

technical assets. When assessing the technical condition of fixed assets, it is important to

determine the availability and use by the enterprise technologically modern and advanced equipment.

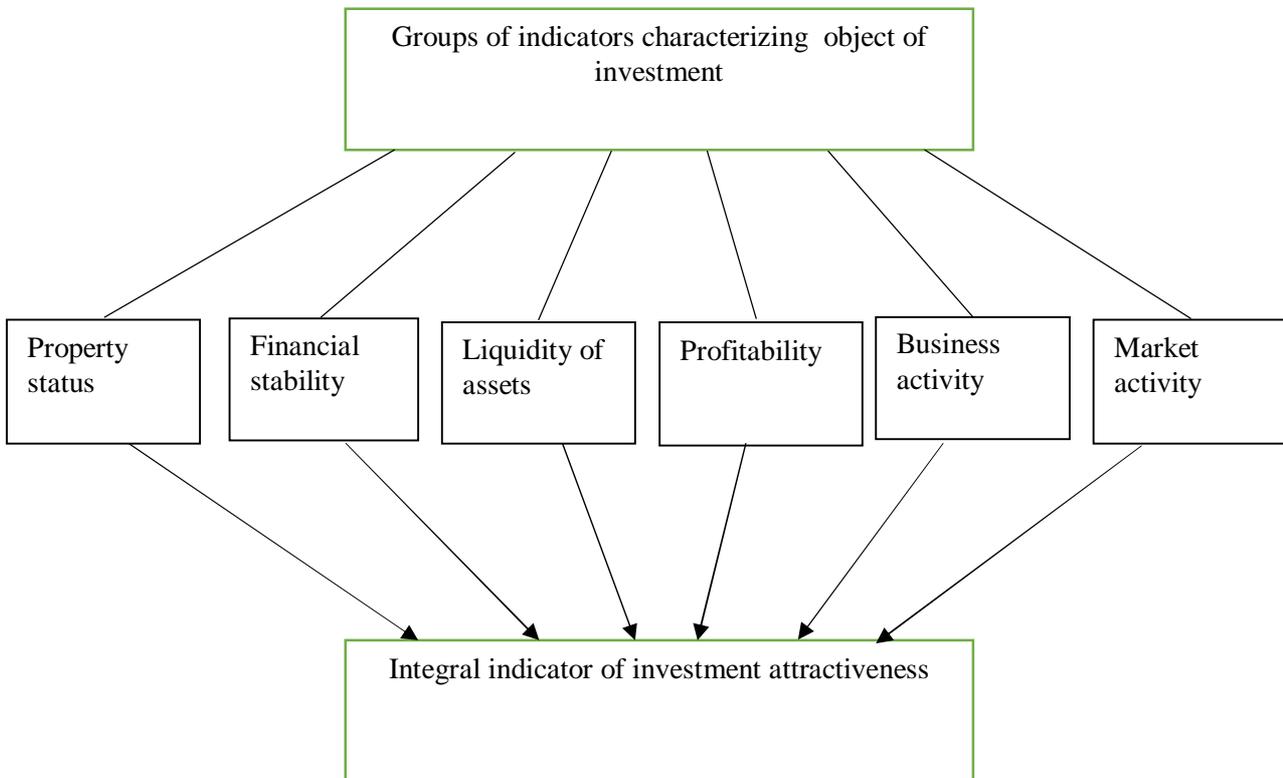


Fig. 1. Indicator groups that are part of the integral indicator of investment attractiveness

For this purpose, the indicator of progressivity of fixed assets is calculated as the share of innovative fixed assets in their overall structure [2], as follows:

$$IP = \frac{VME}{FX_{total}}, \quad (1)$$

where,  $IP$  is the indicator of progressivity of fixed assets;  $VME$  is value of modern and progressive upgraded equipment;  $FX_{total}$  is the total fixed assets value.

Indeed, in the absence of modern equipment, the company will not be able to produce competitive products.

However, it should be noted that the property of the enterprise is not only fixed assets, but also material resources, cash. In our opinion, in this group it is necessary to evaluate all the resource potential of the enterprise, namely: fixed assets, material resources, labor resources, etc.

The second group of indicators is intended to assess the financial stability (solvency) of the

facility. To do this (according to the Methodology) it is suggested to analyze relative indicators like:

- working capital (the difference between current assets and current liabilities);
- inventory to working capital ratio (share of inventories in the amount of working capital);
- equity ratio (proportion of owner capital used to fund a company's assets);
- equity to debt ratio (compares a company's total equity to total debt);
- financial stability index (equity and long-term liabilities to total assets ratio);
- financial leverage ratio (total debts to equity ratio).

It is also recommended to determine type of company's financial stability on the basis of comparison the amount of stocks and the sources of funds that are covering these reserves (net working capital; equity, long-term and medium-term funds; the total amount of the main sources of financing).

The third group generates liquidity indicators. To assess the liquidity of the invested

object, assets are grouped by degree of liquidity and liabilities are grouped by their payment deadlines. As a result, there are four groups of liabilities and four asset groups. The results of their comparison determine the liquidity of the balance sheet.

The assessment of liquidity (according to the Methodology) is determined by calculating:

- the coverage ratio (current ratio, current liquidity);
- absolute liquidity ratio (cash ratio);
- the ratio of receivables and payables;
- the coefficient of coverage of periodic payments (the ratio of the difference in current assets and inventories to the average daily cash payments for business operations).

Liquidity ratios can give investors an idea of how capable a company will be at raising cash to purchase additional assets or to repay creditors quickly, either in an emergency situation, or in the course of normal business [3].

So, in our opinion, this group should include the quick ratio and the working capital to sales ratio.

The quick ratio (is also known as the acid test) is the key measure of a company's liquidity, it answers the question "Can this company meet its current obligations from its liquid assets if suddenly all sales stop?" More stringent than 'current ratio,' it excludes inventories (typically the least liquid of current assets) to concentrate on the more liquid assets of the firm. Usually an acid test ratio of 1.0 or higher is considered satisfactory by lenders and investors [4].

The quick ratio is calculated by adding cash, cash equivalents, short-term investments, and current receivables together then dividing them by current liabilities, as following [5]:

$$Quick\ ratio = \frac{C + CE + STI + CR}{CL}, \quad (2)$$

where,  $C$  is cash;  $CE$  is cash equivalents;  $STI$  is short-term investments;  $CR$  is current receivables and  $CL$  is current liabilities.

Sometimes company financial statements don't give a breakdown of quick assets on the balance sheet. In this case, it's still possible calculate the quick ratio even if some of the quick

asset totals are unknown. Simply subtract inventory and any current prepaid assets from the current asset total for the numerator [5], as in the following example - here's another formula for quick ratio:

$$Quick\ ratio = \frac{TCA - Inv - CPA}{CL}, \quad (3)$$

where,  $TCA$  is Total Current Assets;  $Inv$  is Inventory and  $CPA$  is Current Prepaid Assets.

Both the current and quick ratios are the most widely used measures of short-term liquidity but a problem with them is that they are static. Therefore, we suggest including the 'working capital to sales' ratio in the methodology of investment attractiveness assessment. This indicator has been determined by Ciaran Walsh. This author noted that it is argued that cash flow over the short-term future would be a better indicator of ability to pay [6].

The formula for calculating the indicator "working capital to sales ratio" is as follows:

$$Working\ capital\ to\ sales\ ratio = \frac{CA - CL}{Sales}, \quad (4)$$

where,  $CA$  is current assets.

The 'sales' figure reflects, to some extent, the operating cash flow through the whole system. This ratio, therefore, relates the short-term surplus liquidity to the annual operating cash flow [6].

The fourth group generates profitability indicators. The profitability of an investment object (according to the Methodology) is offered by the calculation of such indicators:

- return on investment (the ratio of profit before tax to long-term liabilities);
- return on equity;
- operating profit margin (calculated as net profits divided by sales);
- return on average total assets (calculated by taking net income and dividing it by average total assets).

The fifth group includes indicators characterizing the business activity of the investment object. Business activity (according to the Methodology) is estimated by calculating indicators like:

- labor productivity;
- yield of capital investments;
- funds turnover and the time of their turnover;

- inventory turnover;
- inventory turnover in days;
- equity turnover;
- total capital turnover.

In our view, assessment of the company's business activity should start with collationing and comparing the growth rates such indicators as profit, income from sales of products and the volume of invested capital (total assets)). The higher the growth rate of income from the sale of products (goods, works, services) and profit, the more promising is the investment of additional capital in the activities of the enterprise. The following ratio of the growth rates of the above indicators is considered optimal [7]:

$$GRpr \geq GRis \geq GRta \geq 100\%, \quad (5)$$

where, (*GRpr*) is profit growth rate; (*GRis*) is growth rate of income from sales of products; (*GRta*) is total assets growth rate.

This relation between growth rates is also called the "golden rule of the enterprise's economy". If this ratio persists at the enterprise, then this confirm that:

- the economic potential of the company is growing;
- the growth rate of income from the sale of products (works and services) of enterprises higher than the growth rate of economic potential;
- the growth rate of company's profit exceeds the growth rate of economic potential.

In the analysis of business activity (according to the Methodology) there are no indicators of turnover of accounts receivable and payables. The urgency and necessity of the calculation and use of the above is explained by their informativeness regarding the state of payments and the formation of free working capital at the enterprise.

The analysis of accounts receivable turnover is based on a comparison of its amounts with the volume of sales and is calculated by the formula:

$$\begin{aligned} \text{Accounts receivable Turnover} &= \\ &= \frac{\text{Sales}}{(\text{AR}_{b.y.} + \text{AR}_{e.y.})/2}, \quad (6) \end{aligned}$$

where, *AR<sub>b.y.</sub>* is accounts receivable at the beginning of the year; *AR<sub>e.y.</sub>* is accounts receivable at the end of the year.

A similar characteristic is the Days sales outstanding:

$$\begin{aligned} \text{Days sales outstanding} &= \\ &= 365 / \text{Accounts receivable Turnover} \quad (7) \end{aligned}$$

The high value of the accounts receivable turnover indicates that the company works with its customers and the state of payments is controlled by company's management.

Low level of accounts receivable turnover "cash out" money from the enterprise, forcing the financial manager to look for new sources of growing accounts' receivable financing.

Analysis of payables turnover (PbT) is based on the comparison of its amounts with the volume of sales:

$$\text{Payables Turnover} = \frac{\text{Sales}}{(\text{PB}_{b.y.} + \text{PB}_{e.y.})/2}, \quad (8)$$

where, *PB<sub>b.y.</sub>* is payables receivable at the beginning of the year; *PB<sub>e.y.</sub>* is payables accounts receivable at the end of the year.

Trend to reduce the payables turnover show a slowdown in the rate of companies' settlements with its creditors.

In the process of analysis, it is necessary to compare the turnover of accounts receivable and payable. It is positive, if the accounts receivable turnover is slightly higher than the payables turnover. This will increase the working capital of the enterprise.

Thus, assessing the accounts receivable turnover and inventory turnover, that make up the bulk of current assets structure, it is not appropriate to separately calculate the working assets turnover [8].

The sixth group is formed by indicators of the assessment of the investment object's market activity (Fig. 2). This group includes (according to the Methodology) indicators like:

- dividends per share (dividing the total cash dividends paid to shareholders by the total primary shares outstanding);
- price-earnings ratio (the ratio of the market price of one share to dividends per share);
- dividend yield (ratio 1 to earnings per share and indicates how much a company pays out in dividends each year relative to its share price). The selected indicators take into account all aspects of the operation of the enterprise, however, in our opinion, incompletely reflect their qualitative characteristics.

Let's take a look at the sixth group of market activity indicators. Proposed indicators are calculated

using the value of dividends. But the company may choose a dividend policy both from the "zero" dividend and up to the policy of "100%" dividend. Therefore, in our opinion, to assess market activity, it is incorrect to

use practically all indicators that take into account dividend payments. In our view, it is advisable to assess the market activity of an enterprise according to the indicators depicted in Figure 3.

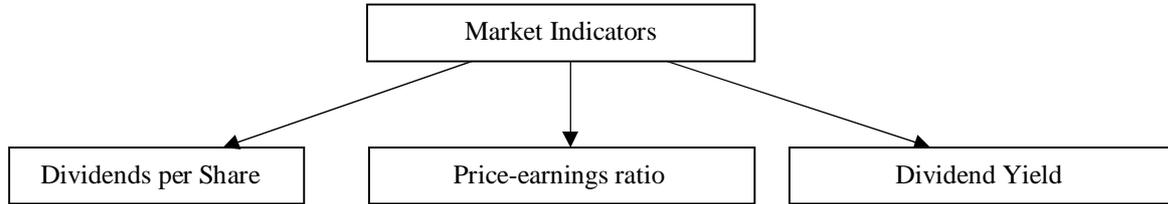


Fig. 2. A group of market indicators according to the Methodology of Integral Assessment of Investment Attractiveness of Enterprises and Organizations

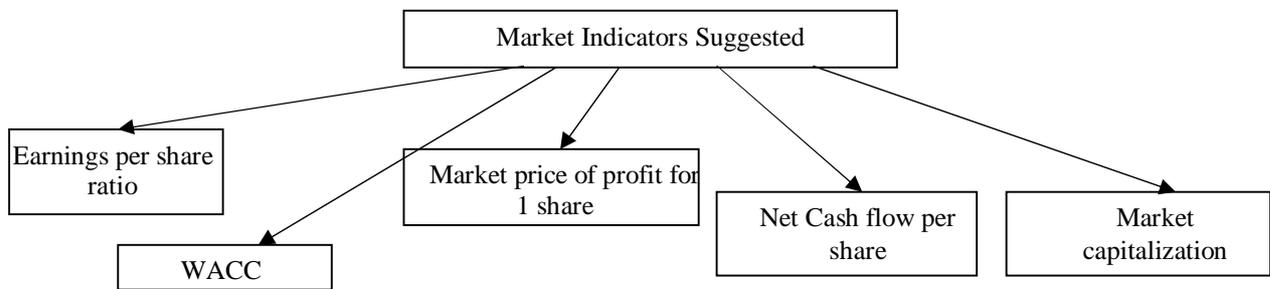


Fig. 3. Market Indicators Suggested to assess the investment attractiveness of the enterprise

Thus, it is difficult to assess the investment attractiveness of the enterprise without calculating and analyzing the indicator of earnings per share, which is calculated as follows:

$$\text{Earnings per share} = \frac{NP}{NSaa}, \quad (9)$$

where, *NP* is net profits remaining at the disposal of owners of the company; *NSaa* is the average annual number of shares.

In our opinion, this indicator is the most common and used in assessing the investment attractiveness of the enterprise. By making investment decisions, investors are guided in the dynamics of profits per share of the enterprise. This indicator is relevant to shareholders who expect to increase (multiply) their capital, regardless of whether they are received in the form of dividends or capitalized. Earnings per share is one of the important factors that influence the formation of the market price of an enterprise's shares.

The price-earnings ratio, which is tied to the volume of dividend payments, is expedient to

replace, or in parallel to said indicator used indicator like the market price of profit for 1 share. The formula for the calculation is as follows:

$$\begin{aligned} \text{Market price of profit for 1 share} &= \\ &= \frac{MPo.sh.}{E1sh}, \quad (10) \end{aligned}$$

where, *MPo.sh.* is the market price of ordinary shares that is used, *E<sub>1sh</sub>* is the profit per 1 ordinary share (the value of the previous one proposed by us namely Earnings per share).

This indicator shows how many times the market share price exceeds the amount of profit per share. The market price of profit for 1 share ratio is used in the case of company acquisition. The high significance of this indicator can testify promising (innovation, image, quality socio-economic policy, etc.) of the company. However, in the short run, as a rule, a decrease in the indicator is expected, as it is obvious that the profits of such a company will increase. Therefore, it is important for investors to conduct a dynamic analysis of the indicator of the market price per profit for 1 share. And, in order to

assess the investment attractiveness of an enterprise, it is necessary to use the growth rates of this indicator.

In our opinion, it is also necessary to include a well-known indicator WACC in the methodology. Weighted average cost of capital (WACC) is an indicator that allows an enterprise to evaluate the effectiveness of its financial investments. WACC characterizes the minimum acceptable rate of return on investments.

To calculate WACC, multiply the cost of each capital component by its proportional weight and take the sum of the results. The method for calculating WACC can be expressed in the following formula:

$$WACC = (E/V) * Re + (D/V)*Rd*(1-Tc), \quad (11)$$

where,  $Re$  is cost of equity;  $Rd$  is cost of debt;  $E$  is market value of the company's equity;  $D$  is market value of the company's debt;  $V = E + D$  is total market value of the company's financing (equity and debt);  $E/V$  is percentage of financing that is equity;  $D/V$  is percentage of financing that is debt;  $Tc$  is corporate tax rate.

All sources of capital, including common stock, preferred stock, bonds and any other long-term debt, are included in a WACC calculation. In brief, WACC shows the overall average rate (average interest rate) an entity pays for raising funds. In many organizations, WACC is the rate of choice for discounted cash flow (DCF) analysis for potential investments and business cash flow scenarios [10].

On our mind, to market indicators it is expedient to enter an indicator that reflects how much money is generated in the process of enterprise activity accounts for 1 ordinary share. This indicator is calculated as follows:

$$Net\ Cash\ flow\ per\ share = \frac{NCF}{NCo.sh.}, \quad (12)$$

where,  $NCF$  is the net cash flow;  $NCo.sh.$  is the number of company's ordinary shares.

The coefficient also shows the potential of the company to pay dividends regardless of the adopted dividend policy.

To the components of the indicators that form the integral estimation of investment attractiveness it is necessary to add the coefficient of market capitalization. Market capitalization refers to the total market value of a company's outstanding shares. Commonly referred to as

"market cap," it is calculated by multiplying a company's shares outstanding by the current market price of one share [11]. The investment community uses this figure to determine a company's size, as opposed to using sales or total asset figures. Using market capitalization to show the size of a company is important because company size is a basic determinant of various characteristics in which investors are interested, including risk.

It should be noted that the indicator of market capitalization is used to calculate stock indices.

### Conclusions

Consequently, the proposed methodology of the integrated assessment of investment attractiveness of enterprises and organizations, which involves the calculation of the integral indicator is based on the assessment of enterprise activity in such areas as - assessment of property status, financial stability, liquidity, profitability of business and market activity. And if we can agree with the structure of the groups of indicators, that characterize the object of investment, then their content filling requires careful review and improvement. This especially applies to the group of indicators characterizing the market activity of the enterprise.

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## FEATURES OF TAXATION OF FORESTRY ENTERPRISES

**Abstract.** The article deals with the features of taxation of forestry enterprises. The domestic practice of tax calculation and payment by enterprises of the State Forestry Agency of Ukraine and the foreign experience of taxation of forestry enterprises are researched. Particular attention is paid to resource payments of forestry enterprises, and rent for the special use of forest resources in particular. The essence of the research has been studied, and the payments to the state and local budgets of the rent for the special use of forest resources have been analyzed. The focus is on the recent changes in taxation of forest enterprises and their financing.

The article determines the relevance of studying the problem of taxation of forestry enterprises and focuses on its financing, which hinders the process of reforestation and forest conservation. It is emphasized that taxation of forestry enterprises should stimulate entrepreneurial initiative, be simple and understandable and ensure the efficiency of the collecting taxes process.

The purpose of the article is to consider the peculiarities of the taxation of forestry enterprises, which are subordinated to the State Forestry Agency of Ukraine.

The research objective is to analyze the tax payments paid by forestry enterprises, to investigate the nature of rent payments, the rent for the special use of forest resources in particular, to study the latest changes in taxation of forestry enterprises and financing of forestry measures.

In the course of the survey it was determined that forestry enterprises are in the general system of taxation and pay taxes, fees (including for the use of forestry resources), which are determined by the Tax Code of Ukraine. In the part of taxes on the use of natural

resources special for forestry the rent for the special use of natural resources is particular.

The analysis of tax payments paid by enterprises of forestry is carried out. According to the results of the activity of the state enterprises of the forest industry for UAH 1 of the received budget funds for forestry and hunting, guard and protection of forests, there were paid UAH 8 in 2015 and UAH 64 in 2016 taxes and payments.

The nature of rent payments, rent for the special use of forest resources in particular, is investigated; taxpayers, the object and the base of taxation, features of accrual and payment are defined.

Analyzing the payment of taxes and fees by state enterprises of the State Agency of Forest Resources of Ukraine for 2015-2017, the distribution of the rent for the special use of forest resources within the state and local budgets was 56% / 44%, respectively.

The experience of foreign countries regarding taxation of the forestry enterprises has been studied. It primarily involves the clear definition of ownership of forests, the access and the use of forests, the use of new trends in sustainable forest management and environmentally sound technologies, which are taken into account when defining the policy of taxation of forest owners. Analyzing the objects from which taxes are levied in forestry in such economically developed countries such as Canada and the USA, Germany, Poland, it is determined that the main ones are wood, logging, land, forest rights

The article focuses on the latest changes regarding taxation of forestry enterprises and financing of the forestry measures. The decision to create a fund of a state development of forestry, its source of formation and directions of the use of the funds are considered.

It is noted that the decision of issues of taxation of forestry enterprises is of strategic importance not only for the national economy, but also for the ecological safety of Europe. Taxes paid by forestry enterprises are fiscal, but the ecologization of the tax system should include state support for the conservation of the forest fund and be accompanied by the integration of forestry products into the industry of the country. This provides additional economic and environmental benefits.

The use of taxes in domestic practice, that allow the removal of part of the rent and net profits of forestry enterprises to finance the recreation of forest resources will promote the stimulation of ecologically balanced and sustainable forest management.

**Key words:** taxation, forestry enterprises, rent for the special use of forest resources, State Agency of Forest Resources of Ukraine.

### **The problem statement**

The State Forestry Agency of Ukraine (hereinafter the State Forestry Agency), which coordinates the activities of 406 enterprises, institutions, organizations, conducts domestic state policy in the field of forestry and hunting. [7, p.41]. The residual financing of the industry in recent years in relation to forestry measures, excessive felling of forests, technological backwardness, and tax pressure have led to the fact that having 9th place in the area of forests and 6th place in terms of wood reserves in Europe, Ukraine's forestry is only 15.9% [6]. The system of taxation of forestry today does not stimulate, and the lack of budget financing is hampering the process of reforestation and forest conservation. Most scholars and practitioners attribute this to the fact that resource payments of forestry enterprises do not relate to the size of forest land and depend on the volume of harvested wood [10, pp. 50-54]

### **The topicality**

The article determines the relevance of studying the problem of taxation of forestry enterprises and focuses on its financing, which hinders the process of reforestation and forest conservation. It is emphasized that taxation of forestry enterprises should stimulate entrepreneurial initiative, be simple and understandable and ensure the efficiency of the collecting taxes process. Taxation of forestry enterprises should stimulate entrepreneurial initiative, be simple and understandable and ensure the efficiency of the process of collecting taxes. The lack of a mechanism for accumulation and redistribution of

income from forestry management creates problems of insufficient budget financing of measures for the guard and protection of forests and forestation.

### **The review of last scientific progress and publications**

Recent studies on taxation of forestry enterprises were conducted by such authors as Y. Koval, O. Furdichko, I. Sinyakiewicz, V. Moroz and others. The conducted researches emphasize the urgency of the problem of taxation of forestry enterprises and define it as the determining part of the national tax and environmental policy of Ukraine and the accounting systems of forestry enterprises.

### **The purpose and problem of research**

The purpose of the article is to consider the specifics of the taxation of forestry enterprises, which are subordinated to the State Forestry Agency of Ukraine.

The research objective is to analyze the tax payments paid by forestry enterprises, to investigate the nature of rent payments, the rent for special use of forest resources in particular, to study the latest changes in taxation of forestry enterprises and financing forestry measures.

### **The exposition of basic matter and finding of research**

The size of budget revenues from forestry enterprises depends not only on the results of their activities, but also on the tax policy of the state. Norms of domestic legislative acts provide for payment for the use of natural resources and conservation and restoration of the environment. Unfortunately, taxes paid by forestry enterprises, ensure the fiscal and distributive functions of the country's tax system in the absence of proper incentives for ecologically balanced, sustainable forest management.

Forestry enterprises are in the general system of taxation and pay taxes, fees (including for the use of forest resources), which are determined by the Tax Code of Ukraine. In the part of taxes on the use of natural resources special for forestry there is a rent for the special use of natural resources (Fig. 1.).

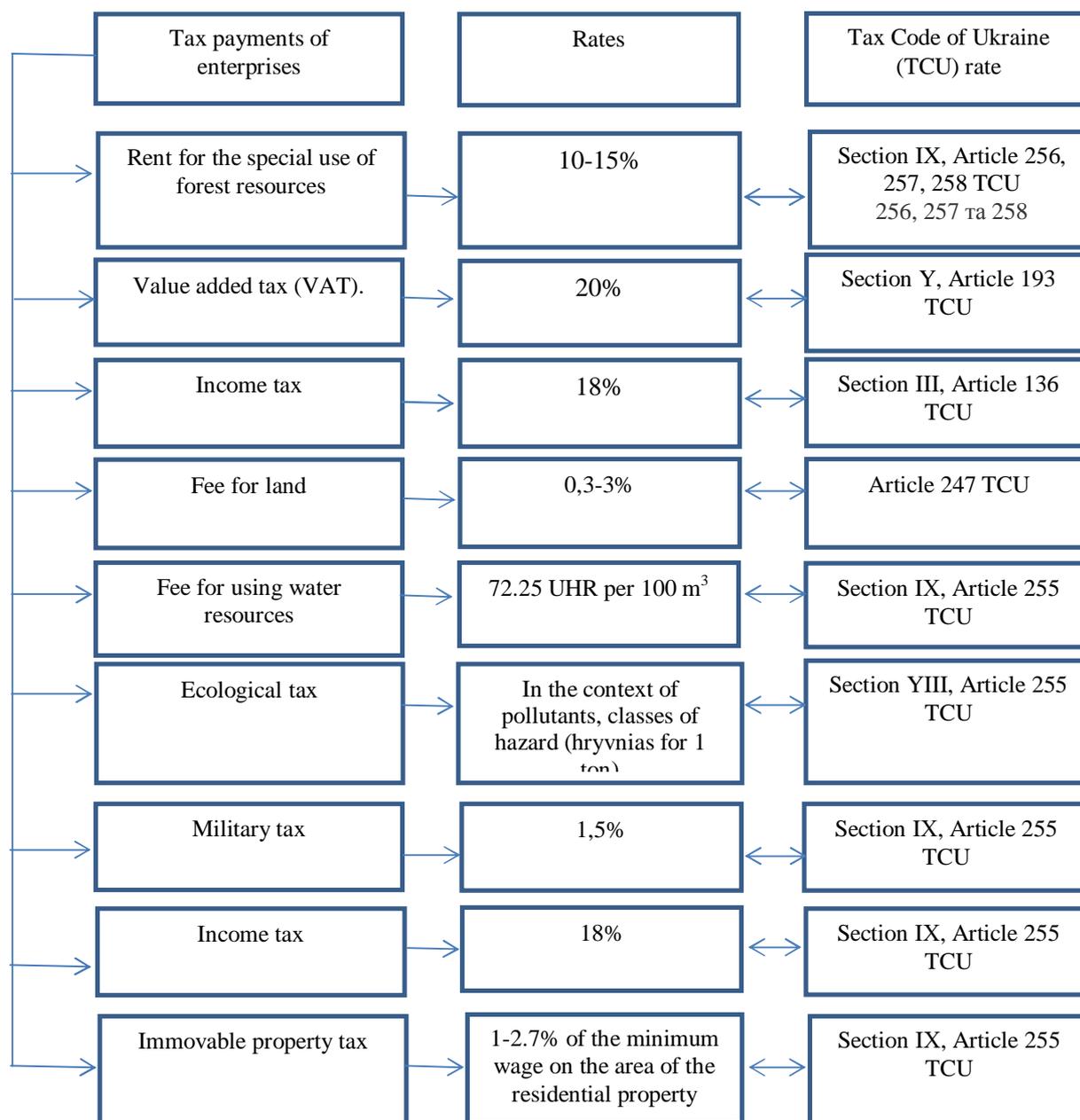
The experience of foreign countries regarding taxation of forestry enterprises primarily involves a clear definition of ownership of forests, access to and

### *Features of Taxation of Forestry Enterprises*

use of forest resources, the use of new trends in sustainable forestry management and environmentally sound technologies that are taken into account in determining the policy of taxation of forest owners. Analyzing the objects from which taxes in forestry economically developed countries such as Canada and the United States, Germany, Poland are levied, it

is determined that the main ones are wood, logging, land, forest rights [9, p. 89].

The vast majority of forests in Ukraine are state-owned. About 1.3 million hectares (13%) of the forestry lands are at the disposal of communal enterprises and 0.1% are forests that are privately owned [7].



*Fig.1 The main tax payments of forestry enterprises under the Tax Code of Ukraine*

For forest management, forests are provided for the permanent use of enterprises, institutions and the organization of several dozens of ministries and departments and 73% of forests - the State Forestry Agency [6, p.5].

The land tax in Ukraine is levied as a component of the rent for the special use of forest resources in the form of forest taxes, although the object of the payment is wood (forest), and not land (land plot).

**Table 1**  
**Types of taxes in the forestry of foreign countries**

Countries	Types of taxes in the forestry sector							
	Land tax	Natural resource tax	Forest tax	Round timber tax	Forest tax on the lease	Lease tax	Tax on forest heritage	The tax on the harvesting license
Canada, USA	+	+	+	+	+	+	+	+
Poland	+	+	+	+	-+	-	+	-
Germany	+	-	+	+	+	-	+	-
Estonia	+	+	+	-	-	-	+	-

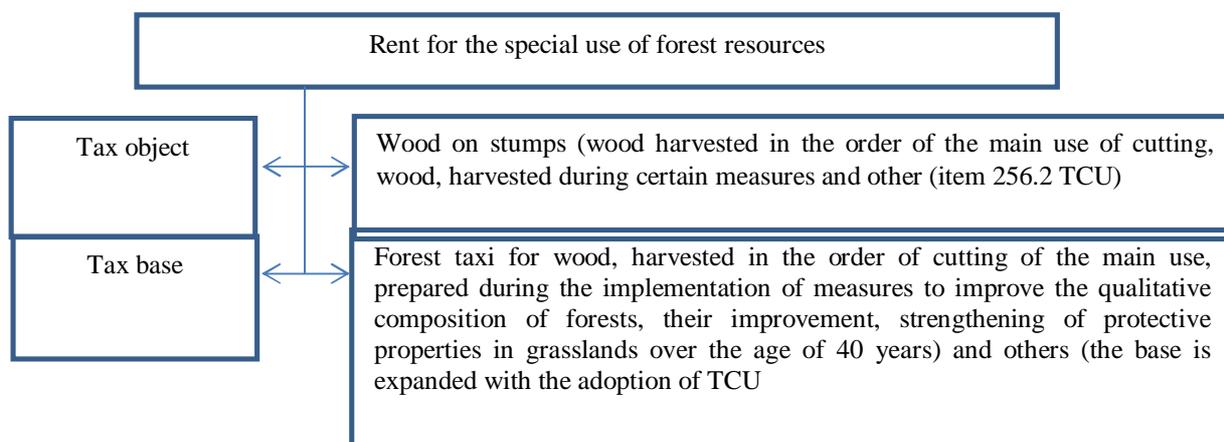
Payers of the rent for the special use of forest resources are forest users - legal entities, their affiliate, branches, other separate units that do not have the status of a legal entity, permanent representative offices of non-residents who receive income from sources of their origin from Ukraine or perform agency (representative) functions in relation to such non-residents or their founders, individuals (except for individuals who are entitled free of charge without obtaining a special permit to use forest resources in accordance with forest legislation) and individuals - entrepreneurs, that carry special use forest resources under a special

permit (a forest harvesting ticket or a forest ticket) or under the terms of the long-term temporary forest use [2; 3].

The object and the base of the taxation of the payment for the special use of forest resources is given in Fig. 2

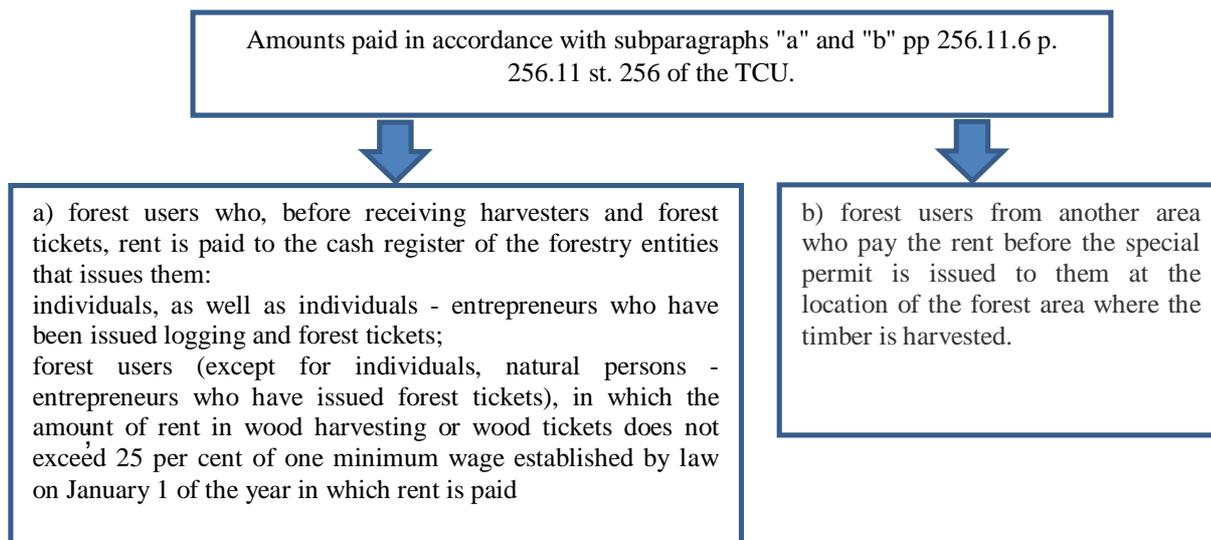
Subjects of forestry relations that issue special permits, by the 10th of the month following the reporting quarter, send to the bodies of the State Tax Service a list of forest users who have been issued harvesting tickets and forest tickets in the form established by the central executive body, which ensures formation state financial policy, in agreement with the central executive body, which ensures the formation of state policy in the field of forestry [3].

Forest users who make a special use of forest resources pay a rent on the basis of special permits (wood harvesting or forest tickets) or in accordance with the terms of the contract for the long-term temporary use of forests (Article 256.1 of Article 256 of the Code) and quarterly tax returns for the rent for the special use of forest resources. It is paid in equal parts from the amount of the rent, specified in the harvesting tickets received (special permits) within 10 calendar days after the expiration of the deadline for submission of the tax return issued in the corresponding calendar year, except for the amounts indicated in fig. 3



*Fig.2 The object is the base of taxation of rent for the special use of forest resources*

### Features of Taxation of Forestry Enterprises



*Fig. 3 Amounts of the rent payments for the special use of forest resources specified in harvesting tickets, which are not taken into account when paying by forest users*

The amount of the rent, specified in the harvesting and in the forest ticket, subjects to conversion by the subject of forest relations, which issues special permits, if [2; 3]:

a) the total number of actually harvested wood during its issue, taking into account the area exceeding the number indicated in the harvest book and the number more than 10 percent;

b) the actual use of forest resources exceeds the amount specified in the forest ticket for the entire amount of such excess.

The fee rates for the harvesting of wood of the main forest species are differentiated in the section of two belts, five bits and large, medium and small business (bark) wood, as well as firewood (with bark). Distribution of forests by belts [2]:

- all forests belong to the first zone, with the exception of the forests of the Transcarpathian, Ivano-Frankivsk and Chernivtsi regions and the forests of the mountainous area of the Lviv region;

- the forests of the Transcarpathian, Ivano-Frankivsk and Chernivtsi regions and the forests of the mountainous zone of the Lviv region belong to the second belt.

The trunk segments (in the upper section without bark) in diameter from 25 centimeters or more belong to the big wood of all forest species, the segments in diameter from 13 to 24 centimeters belong to the average, the segments in diameter from 3 to 12 centimeters belong to the small wood. The firewood includes varieties that can be used for

technological purposes, and are also not suitable for industrial processing (firewood).

For the wood harvested during selective felling: the main use of the rate-collection is reduced by 20 percent, and measures to improve the qualitative composition of forests, their improvement, strengthening of protective properties (in woodland over 40 years old - logging of forest care, selective sanitary felling, selective forest-dependent felling, felling associated with the reconstruction, landscaping felling and reformation felling) - by 50 percent. Percentage discounts are calculated from each collection rate separately [2; 3].

The collection rates for the harvesting of secondary forest materials, the implementation of by-products of forest use and the utilization of useful properties of forests, are set by the The Verkhovna Rada of the Autonomous Republic of Crimea, oblast, Kyiv and Sevastopol city councils.

Despite the fact that the rent for the special use of forest resources is only 0.1% of tax revenues in the structure of all incomes of the consolidated budget of Ukraine [6], it is, of course, one of the important sources of the formation of financial resources for part of the rent for the use of natural resources of enterprises and the component of revenues of the state and local budgets of Ukraine.

According to the State Forestry Agency in 2017, forestry enterprises paid taxes and dues and ECU for the amount of 5026.5 million UAH to the

budget of Ukraine. The largest share in the amount of taxes and duties paid is VAT - 38%, personal

income tax (24%), the rent for the special use of forest resources (21.2%) [7, p.26].

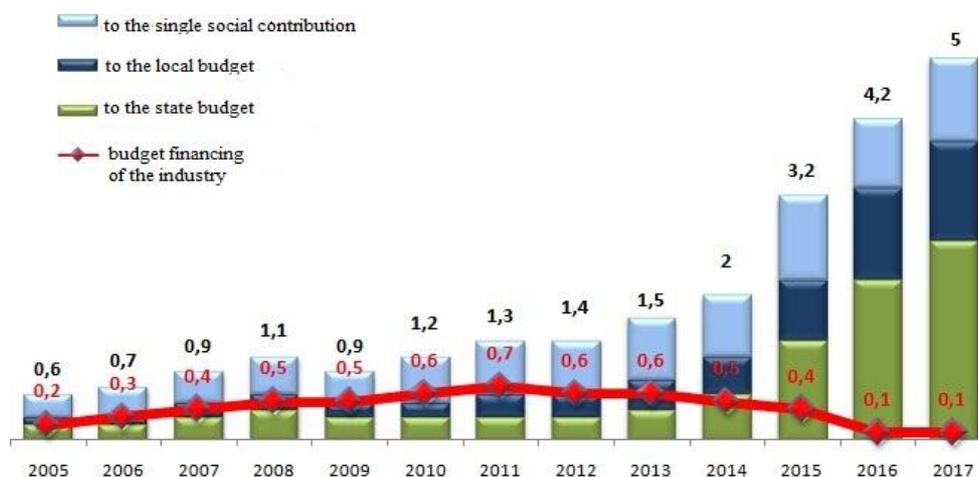


Fig. 4. Dynamics of the introduction of taxes and mandatory payments by enterprises of the State Agency of Forest Resources of Ukraine into the budget, UAH billions [7, p.27]

According to the results of the activity of the state enterprises of the forest industry for UAH 1 of the received budget funds for forestry and hunting, guard and protection of forests, there were paid UAH 8 in 2015 and UAH 64 in 2016 taxes and payments.

Analyzing the payment of taxes and fees by state enterprises of the State Agency of Forest Resources of Ukraine for 2015-2017, the distribution of the rent for the special use of forest resources within the state and local budgets was 56% / 44%, respectively.

Table 2

**Payment of taxes and fees by state enterprises of the State Forestry Agency, mln. UAH**

Indicator	Years			Absolute deviation	
	2015	2016	2017	2016 - 2015	2017 - 2016
Included in the budget, including:	2059,7	3299,5	3904,2	1239,8	604,7
- to the state budget	1307,9	2055,2	2554,4	747,3	499,2
including: rent for the special use of forest resources	431,4	464,9	464	33,5	-0,9
- to local budgets	751,8	1244,3	1349,8	492,5	105,5
including: rent for the special use of forest resources	309,2	456	362	146,8	-94
Paid Single Social Contribution	1099,9	908,4	1122,3	-191,5	13,9
Together, taxes and Single social contributions are paid	3159,6	4207,9	5026,5	1048,3	919,6

It is compiled according to the data of the State Forestry Agency [6, p.39; 7, p.27]

Reduction of the rent for the special use of resources in 2017 as compared to 2016 was due to the reduction of harvested liquid wood from all types of felling (by 2.5%). Despite the increase in the amount of tax payments (including rent for the special use of forest resources), in 2016 the funding for forestry and hunting activities from the state

budget was stopped and was carried out only under budget programs.

In order to reduce the cost of the staff maintaining, most forestry holdings, for the example of European countries, have started to draw the small private companies, which were on a simplified taxation system for forestry

### *Features of Taxation of Forestry Enterprises*

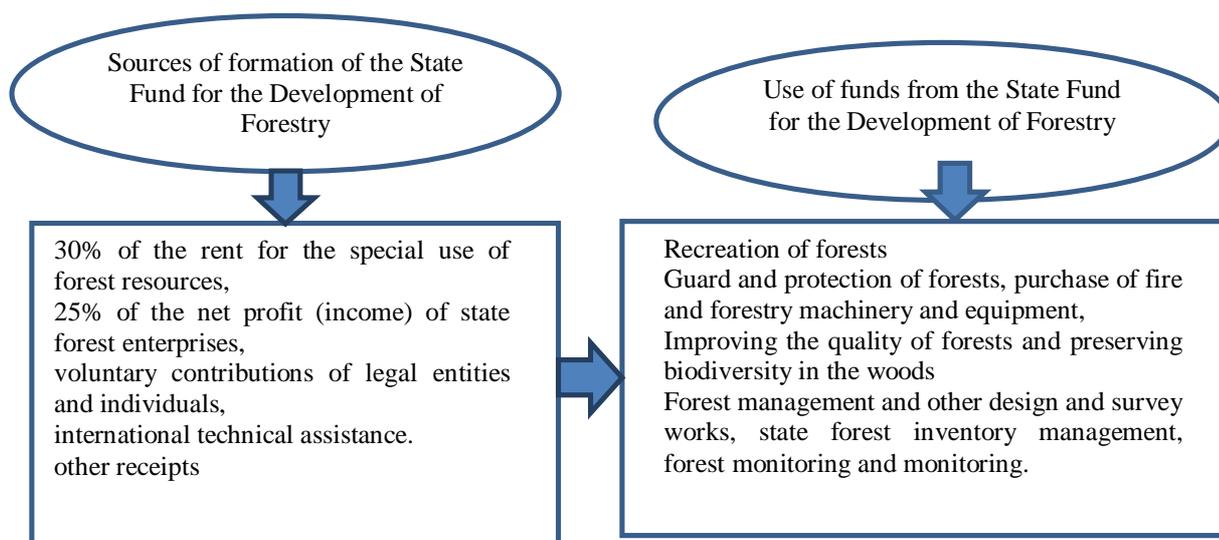
operations (logging, logging, timber removal, harvesting of forest crops, etc.). According to the State Forestry Agency, almost 10.4 million cubic meters (66%) of timber is harvested by hired brigades [7]. Following the adoption of the latest edition of the Tax Code, taxation of the simplified tax system has become more complicated, therefore, in the overwhelming majority, these enterprises are now shifting to the general system of taxation.

There is a scientific opinion that the replacement of the rent for the special use of forest resources for land tax (on the example of agricultural enterprises) will increase the efficiency of forest use [10]. However, in our opinion, the increase of tax pressure without revision of the model of redistribution of budget revenues and orientation to the ecological and economic activity of forestry enterprises will not affect the increase of financing of enterprises of the State Forest Fund and obtain an additional ecological and economic effect from their activity. For example, after the adoption of the Law №№ 1621-VII from January 1, 2015, the VAT exemption on supply operations was cancelled, including the import of wood products of commodity positions 4401, 4403, 4404 under the Ukrainian Foreign Economic Relations (except for briquettes and granules of commodity subcategory UCT ZET 4401 30 90 00), as well as paper and cardboard for utilization (waste paper

and wastes) of commodity position 4707 according to the UKT LET and these operations are taxed at the rate of value added tax at the rate of 20% [1]. However, the increase in the amount of taxes paid to the state budget in 2016, compared with previous periods, did not affect the increase in financing of enterprises of the State Forest Fund [6; 7].

A positive factor was the adoption of amendments to Article 98 of the Forest Code of Ukraine regarding the order of financing of such measures. This allowed removing the norms for the binding of funding for forestry enterprises to state target programs. In the plan to increase financing of the industry, there was made a decision to create a fund for state forestry development, which suggested increasing the rent for the special use of forest resources in the part of the timber harvested from the cutting of main uses [5]. In addition, it is proposed to fill the fund at the expense of part of the net profit (income) of state forestry enterprises in the special state budget fund [3; 7].

According to expert estimates, this decision should help to resolve the issue of forestry measures financing, ensuring not only the use of funds for the forests reproduction, guard and protection, fire protection measures, improvement of the quality of forests, conservation of forests, and forest management. The sources of fund formation and use of its costs are presented in Fig. 5.



*Fig. 5. The sources of formation and use of funds from the State Fund for Forestry Development [3; 5; 7, p.26]*

### The conclusion

The decision of issues of taxation of forestry enterprises has a strategic significance not only for the national economy, but also for the ecological safety of Europe. Taxes paid by forestry enterprises are fiscal, but the ecologization of the tax system should include state support for the conservation of the forest fund and be accompanied by the integration of forestry products into the industry of the country. This will provide additional economic and environmental benefits.

Of course, rent for the special use of forest resources is one of the important sources of the formation of Ukraine's financial resources in terms of rent for the use of natural resources. The use in domestic practice of taxes that allow the removal of part of the rent and net profits of forestry enterprises to finance the recreation of forest resources will stimulate the promotion of ecologically balanced and sustainable forest management.

### The prospective of further research in this field

Taxation of forestry enterprises should stimulate forestry activities and entrepreneurial initiatives, be simple and understandable and ensure the efficiency of the process of accumulation and distribution of tax payments.

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## METHODOLOGICAL APPROACHES TO DETERMINING THE MONOPOLISATION LEVEL OF PRIMARY RESIDENTIAL REAL ESTATE REGIONAL MARKETS IN UKRAINE

**Abstract.** In this article the author investigates the typology and main characteristics of the markets and provides the definition of the concept of "competition". Several methodological approaches were suggested in order to determine the magnitude of the monopolisation level of primary residential real estate regional markets as well as the market share belonging to a certain construction company. The aims of these approaches are: to determine the concentration level in the market – the scale of the largest enterprises "threshold market share"; to analyse the state of the competitive environment – "The Index of market concentration"; the Linda index; "The Herfindahl-Hirschman Index"; "The Lerner Index"; "The Dispersion Index"; "The Entropy Index"; "The Lorentz curve"; The Gini coefficient.

**Key words:** competition definition methodology, real estate market monopolisation, developers competition, residential real estate, housing, primary market, market share of construction, housing construction.

### Formulation of the problem

The residential real estate market is a special form of market relations. Its development is one of the decisive directions of the economic system formation in Ukraine based on the private property superiority and self-regulation market mechanisms, economy functioning and development [15, 24]. It is necessary to consider the residential property market an integral system, that is a set of interconnected and interacting elements (sellers-buyers) operating on the basis of the price mechanism, taking into account the legal regime of appropriation, social value, properties, and generic features of real estate [15]. The housing market is subject to the functioning laws of the financial and

commodity markets. Special features of the real estate are: its immobility, connection with the land, the natural production form of existence, regular use, gradual value transfer in the operational process, etc.

Due to the realisation of the sale and purchase of real estate operations, the residential real estate market creates an environment and stimulates the development of other types of economic activity. In this context, it can be argued that the real estate market is one of the key markets of national economy [15].

### Study analysis of the problem

In the scientific literature, the issues related to theoretical and methodological approaches to the definition of the level of markets monopolisation were studied by such Ukrainian and foreign scientists as N. Bakhvalov [23], I. Beliavska [1], I. Burkun [2], V. Hotra [5], S. Danylina [7], G. Dinz [8], T. Diachenko [9], S. Kireiev [11], I. Kryvovyaziuk [12], V. Lagutin [13], K. Mazaraki [24], O. Miniailo [15], R. Okprepyi [17], V. Osetskyi [18], O. Strishenets [21]. On the other hand, the questions concerning methodological approaches to determining the monopolisation level of primary residential real estate regional markets in Ukraine require further research.

### The purpose and objectives of the article

The purpose of this study is to provide a meaningful and in-depth methodological search for approaches that will help to determine the degree with which construction companies and

organisations exercise a monopoly over primary residential real estate regional markets.

**Presentation of the main material and the substantiation of the study results.**

The residential property market being an integral part of the general market, all the problems of the Ukrainian economy are characteristic of it: uneven development of its segments, insufficiency of state investments, the presence of a significant shadow sector [11].

Competition is indispensable for a normal market existence. The existence of effective competition, which balances the interests of market relations subjects, stimulates the introduction of innovations and competitions in all spheres of activity, is one of the main conditions for the development of the Ukrainian economy. Such competition opens up new opportunities for production improvement, generates an optimal structure of market demand and supply, and helps to optimise production costs. Competition in the residential real estate market is an important prerequisite for its existence and development, forcing market participants to introduce more efficient ways of production, to offer new concepts and price proposals, as well as to start working in new segments [19].

As we mentioned before, there are different types of markets: the pure (perfect) competition market, the monopolistic competition market, the oligopolistic market and the pure monopoly market. According to the Law of Ukraine "On limiting monopolies and preventing unfair competition in entrepreneurial activity," competition is the competition of enterprises, while individual actions limit the ability of each of them to influence the conditions for the sale of goods and services on the market, simultaneously stimulating the production of goods needed by the consumer [10].

The pure free competition market is characterised by a large number of sellers and buyers, none of which affect the level of current market prices. An example of a free competition market is the international markets for forest, non-ferrous metals, wheat, and securities [16].

The monopolistic competition market is characterised by a considerable number of buyers and sellers who make deals with prices negotiated within a wide range. The price of each product is

determined by demand and its consumer characteristics.

The oligopolistic market consists of a limited number of sellers, whose goods can be characterised by homogeneity and interchangeability, as well as their being different.

The market of pure monopoly is the market where one seller is the owner. When setting prices for products, the seller-monopolist usually possesses a significant level of freedom. Meanwhile, the price level is determined by the demand for its products.

On the whole, in the economic system of developed countries, the various market levers of state regulation, economic self-regulation and corporate planning merge, but it should be noted that their economies tend to experience crisis phenomena. An important factor of the imperfect operation of the mechanism of combining the above-mentioned levers is the presence of various kinds of monopolies in various economic spheres. P.E. Samuelson characterises the real economy as a combination of elements of competition with imperfections generated by monopolies [16]. The study of the competition essence and its acting mechanism allows to more effectively influence the development of modern economic mechanism.

The degree of market concentration can be analysed when examining the size of the market share belonging to a certain firm. However, economic theory provides a number of more advanced instruments of concentration levels measuring, which include: the market concentration ratio; the Herfindahl-Hirschman Index; the dispersion of market shares; the entropy of market shares; the Gini index [13, 15].

In the process of the market structure analysis, quantitative approaches and methods are frequently used to evaluate the levels of concentration [22]. The concentration of sellers reflects the relative magnitude and number of enterprises operating in the industry. The smaller the firms, the higher the level of concentration. With the equal number of firms in the markets, the more firms differ from each other in size, the higher the concentration level. However, what serves as an indicator of the size of the firm and the market boundaries is essential to determine.

*Table 1*

**Types and basic characteristics of the markets**

Market Type	Market Subjects Number		Products Homogeneity	Goods Variability	Interchangeability of Market Subjects	Market Entrance-Exit	Subjects Shares on the Market
	Sellers	Buyers					
Pure Free Competition	Multiple	Multiple	Homogeneous	Full	None	Open	Equal and Small
The monopolistic competition	Limited	Multiple	Differentiated	High Level	Insignificant	Limited	Dominant enterprise and outsider enterprises with a small share in the market
The oligopolistic market	Several	Multiple	Homogeneous or Differentiated	High Level	Significant	Limited	Large, quasi-equal
Monopoly	Single	Multiple	Homogeneous	None	None	Closed	100%
Monopsony	Multiple	Single	Slightly differentiated or homogeneous	Insignificant	None	Closed	100%

*\*Compiled by the author, Pavlov K., according to the sources: [2, 3].*

With the purpose of determining the size (scale) of an enterprise the indicator is generated by the indicators of an enterprise's sales in the total volume of sales, the indicator of the level of employment at the enterprise within the limits of the total staff number involved in the production, or the amount of the asset value of enterprise share in the total asset value of all enterprises. Due to the limited statistical data for the residential real estate market, the share of a construction firm is most often estimated by the ratio of the number of residential buildings built by the firm to the total number of objects on the residential construction market.

The magnitude indicator of the largest enterprises can serve a means of concentration indicators characterisation in the market, also called the threshold market share [22].

For example, according to the Russian law of 1991 "On competition and limitation of monopolistic activity in commodity markets", provided that the share of the company exceeds the threshold of 35% in this market, the enterprise is

included in the State register of monopolist enterprises. According to the newer version of the law of 1995, an enterprise exercising control over more than 65% of the market is considered an absolute monopoly. An enterprise the market share of which varies between 35-65% can also be considered a monopolist, provided that the antitrust enforcement authorities can prove that it dominates the market and is thus consequently abusing the market situation [22].

Meanwhile, studying the threshold indicator as the market structure characterisation indicator, it should be noted that this indicator applies to a particular enterprise and does not actually characterise the overall market structure of a particular product. To determine this goal other indicators are used [22].

Market concentration index. To analyse the state of the competitive environment, we calculate the market concentration factor  $CR_n$ . This coefficient is defined as the sum of market shares of the largest firms operating on the market. It characterises the share of several

largest enterprises in percentages in the total market volume.

Thus, the market concentration index is an indicator with widespread implementation and worldwide popularity to determine and evaluate the structure of the market [15]. Its disadvantage is not taking into account information on the influence of firms remaining beyond the largest ones, and also does not showing the distribution of sales among the largest market participants. This indicator can distinguish oligopoly from monopolistic and pure competition in the industry. It is defined as a percentage of the total sales in the industry, which falls on several large-scale firms, ranked relative to market share [15]. This indicator is calculated as:

$$CR_n = \sum_{i=1}^n S_i, i = 1, 2, \dots, n \quad (1)$$

in which  $n$  is the number of largest firms in the market for which the indicator is calculated;  $S_i$  is the share of the  $i=1$  firm in the market (in the industry).

If the concentration index develops approximation to a value of 100%, the market can be characterised by a high degree of monopolisation. Provided that its value is "slightly zero deviant", it can be regarded as a competitive one [22].

It should also be noted that the concentration index does not take into account the market structural features of the industry as a whole. For instance, an identical concentration index can be obtained by means of the analysis of two industries, in either of which there are four largest enterprises yielding about 60% of all industrial products. Nevertheless, the situation on the market may vary, say, in one industry there can be 10 enterprises and 100 in the other. In addition, in the very "core" of the market, a completely different share distribution is possible. Similarly, predominance of one enterprise over others can be demonstrated by four firms with 15% (equivalent distribution) or with 35%, 10%, 10%, and 5%, respectively [22].

The concentration index is exclusively acceptable as a "rough" factor demonstrating the dominant position in a small number of enterprises, which distinguishes oligopolistic from monopolistic and perfect competition, or as an

additional indicator that is used concurrently with other indicators of concentration in the market [22].

V.G. Shepherd described all American markets in a four-ratio ( $CR_4$ ) concentration factor, dividing them into four groups [5]: pure monopoly ( $CR_4 \approx 100\%$ ); dominant firms ( $50\% < CR_4 < 90\%$ ); limited oligopoly ( $CR_4 > 60\%$ ); effective competition ( $CR_4 < 40\%$ ).

One of the main objectives of competitive relations regulating in the process of creating an effective competitive environment in the housing markets is the strict control enforcement over compliance with legislation on the protection of economic competition. Therefore, in Ukraine, unlike other countries, the proportion of economic entities, recognised as monopolies, is more rigidly determined. In accordance with the provisions of the Law "On the Protection of Economic Competition", the market share of one business entity exceeding 35%, three exceeding 50%, and five exceeding 70% is one of the conditions defining the position of a business entity in the market as dominant [7, 12].

The Linda Index. The insufficiency of the concentration index for the characterisation of the concentration of production and economic competition is presupposed due to the fact that it does not reflect either the distribution of shares within the group of largest firms, or between firms-outsiders. In order to solve this problem, in the countries of the European Union, the Linda Index (IL), which was initially proposed by Remo Linda, a member of the European Union Commission in Brussels, is used. This index, along with the concentration index, should be applicable only to several major enterprises, notwithstanding, in fact, the situation "near" the market. However, unlike the concentration index, the Linda Index is aimed to illustrate the differences in the "core (core)" market [22]. The Linda index allows to determine the number of firms and those of them occupying leading positions in the market. To realise this goal, the index is calculated in stages: first – for two largest enterprises, then for three, and continues so until the continuity of functions is violated (the trend of the index decrease will not replace the trend of its next

increase) [17]. This continuity violation illustrates that the enterprise to be added last owns a conspicuously smaller market share than any of the previous companies [22].

For two largest firms, it equals the percentage of their market shares:

$$IL_2 = \frac{S_1}{S_2} \times 100\% \quad (2)$$

If  $S_1 = 50\%$ ,  $S_2 = 25\%$ , then  $IL_2 = 200\%$ .

$$IL_4 = \frac{1}{3} \left[ \frac{S_1}{(S_2 + S_3 + S_4)/3} + \frac{(S_1 + S_2)/2}{(S_3 + S_4)/2} + \frac{(S_1 + S_2 + S_3)/3}{S_4} \right] \times 100\% , \quad (4)$$

The new firms being added, the Linda index reduction means that the core is not formed yet. If the core of the market is formed by one firm, the index will increase with the addition of the second and third firms. For example, if the Linda index for one firm is 250, for two firms it is 200, for three firms it is 150, and for the four companies 220, respectively, this means that the "core" of the market is comprised of the first three firms.

The Herfindahl-Hirschman Index. In the United States of America, since 1982, in the process of state antitrust policy implementation, the Census Bureau has been using the Herfindahl-Hirschman Index (HHI) as a complete alternative to the concentration index. This indicator can also be regarded as a unique concentration index. Although, it is the distribution of "market ownership" among all players in a particular market that is determined thereupon, not the market share taken over by several largest companies [22].

This indicator is calculated as a sum of the squares of market shares percentages of all entities in the market in total:

$$HHI = \sum_{i=1}^n S_i^2 , \quad (5)$$

where  $S_i$  is the share of the  $i$ -th firm in the industry, in %;  $n$  – the number of firms in the industry, which is usually  $n=50$ . In this case, market shares of firms can be expressed in ratios or percentages. In the first case, the HHI will gain a value ranging from 0 to 1, and in the second case, from 0 to 10,000.

If the number of firms exceeds one, the HHI can vary from 0 to 10,000 (up to 1) depending on the distribution of market shares. In the case of perfect competition, provided that there are many sellers on the market, with a small share of the market each, the Herfindahl-Hirschman Index will approach zero. A unique monopoly enterprise operating in the market,

For three largest firms the Linda Index is determined by the formula:

$$IL_3 = \frac{1}{2} \left[ \frac{S_1}{(S_2 + S_3)/2} + \frac{(S_1 + S_2)/2}{S_3} \right] \times 100\% \quad (3)$$

For four firms the Linda Index is calculated as:

the value of HHI will equal 1 (or 10,000). For a market with a high level of competition, with more than 100 enterprises, for instance, corresponding to a value of 1% each, the HHI will be 100 (or 0.01). In the market, where there operate 10 companies, each with identical volume of market shares, the yielded value equals to 1000 (or 0.1). Indeed, the higher the value of the HHI index, the higher the level of concentration in the seller market, and vice versa, the lower the importance of the HHI index, the stronger the level of competition in the market and the less concentration and power of enterprises in the market [17].

The Herfindahl-Hirschman Index is used in the United States as a benchmark for determining the possibility of firms merger [4]. According to the US Merger Directive, amended on August 19, 2010, if the Herfindahl-Hirschman Index is less than 1500, the market is considered to be of low-concentration, any merger is unhindered and doesn't require notification. If the HHI index ranges from 1500 to 2500, the market is considered to be moderately concentrated [15]. If the HHI index exceeds the 2500 mark, the market is considered to be highly concentrated. In this case, a merger of firms is permitted only when the Herfindahl-Hirschman index will increase by less than 50 points as a result of the merger; if an index is increased from 50 to 100 points, additional control and verification are imposed; provided that the increase in the HHI is more than 100 points – the merger is prohibited [22]. In addition, the economists have proved the correlation between the HHI and the correlation indices, which allows to make certain marketing conclusions regarding the market structure, typology, competitive position and level of market monopolisation (Table 2) [1, 17].

Table 2

**The relationship interpretation indicators between HHI and CR**

HHI	The minimum possible number of market participants (type of market)	Maximum possible ratio of the largest sellers,%			
		CR <sub>1</sub>	CR <sub>2</sub>	CR <sub>3</sub>	CR <sub>4</sub>
500	20 – a perfect competition market	22	31	39	44
1000	10 – a perfect or monopolistic competition market	31	44	54	63
1800	6 – a market of monopolistic competition approaching oligopoly	42	60	72	85
3000	4 – an oligopoly approaching monopoly	54	75	95	100
5000	2 – a monopoly	70	100	100	100

\*Compiled by the author, K. Pavlov, based on: [17].

One of the main shortcomings of the HHI Index is that its calculation accuracy requires a complete analytical framework for all market participants, the collection of which tends to currently be complicated [17].

The recent research has enabled to determine the direct dependence of the concentration of production processes of the individually selected for the sake of research country upon the consolidation stage of both national corporations and corporations of other states.

The American scientists G. Dinz, F. Kroege, S. Zeisel were the first to introduce in the science the concept of the consolidation curve, according to which the process of consolidation in various industries is carried out with variable intensity and with variable degrees, characterised by a different percentage of the concentration of the three largest companies within the industry [8].

According to this concept, the sectoral consolidation process takes place in four stages: initial; growth; specialisation; equilibrium; alliances (Table 3).

Table 3

**The state of world industry concentration**

Consolidation Stages	Initial	Growth	Specialisation	Equilibrium and alliances
Coefficient of concentration of the three largest commodity producers	Up to 30 %	Up to 35 %	35–75 %	75 %
Industries	textile industry, construction, services, insurance.	chemical industry, banking, breweries, auto parts, paper production, restaurant catering, pharmaceuticals.	coal production, dairy products, engines, retail trade, metallurgy, automobile industry, tire industry, aircraft engineering, shipbuilding.	production of aluminum, cement, iron ore extraction and processing, oil refining, footwear production, soft drinks production, tobacco industry
Stage Duration	up to 5 years	up to 7 years	up to 5 years	up to 5 years

\* Compiled by the author, K. Pavlov, based on: [18].

As shown in the Table 3.4 above, the international construction market is characterised by a low level of concentration and a high level of competition.

The HHI Index as an indicator of the concentration level is directly related to the Lerner Index of Monopoly Power . This feature is widely used in economic research [17, 22]. In the course of

microeconomics, the index characterising monopoly power is considered as a certain value, the price of which exceeds the marginal cost:

$$L = P - \frac{MC}{P} = -\frac{1}{e_D}, \quad (6)$$

where P is production unit price, MC is marginal costs associated with the production of an

additional production unit – the elasticity of demand for the price of the company. The larger the gap between P and MS, the greater the degree of monopolisation of the market. The value of L ranges from a low of 0 to a high of 1. In a perfect competition, the Lerner Index is 0.

The Lerner Index value can be directly related to the HHI for the oligopolistic market, assuming that it is described by means of the Cournot model [22]. In this case, for an individual enterprise, the Lerner Index will be calculated (index of monopoly power) as:

$$L_i = -s_i / e_D, \quad (7)$$

where  $S_i$  – the firm's market share;  $e_D$  – an indicator of the market demand elasticity [22]. In this case, the average index for the industry (with the shares of enterprises in the market serving as scales) is:

$$L = -HHI / e_D \quad (8)$$

It should be noted that there is also a dependence of the Lerner Index on the level of concentration, taking into account the coherence of the pricing policy of enterprises [17, 22]:

$$\begin{aligned} \text{for the firm - } L_i &= \\ &= -b / e_D - (1-b) k_i / e_D; \end{aligned} \quad (9)$$

$$\begin{aligned} \text{for the industry - } L &= \\ &= -b / e_D - (1-b) HHI / e_D, \end{aligned} \quad (10)$$

where  $b$  is an indicator of the firm's pricing policy consistency (the degree of conspiracy), which assumes the value from the low of 0, which corresponds to the cooperation of the companies, according to Cournot, to the high of 1, which corresponds to the case of the cartel agreement. The higher the price coherence index, the less the dependence of the Lerner Index of the firm on its market share, and for the industry the less the dependence on the level of sellers concentration [17, 22].

For a more profound estimation of the uneven distribution of market shares, specific indicators are sometimes used – the entropy coefficient, the market share variance index. The Gini coefficient and the Lorentz curve are also used in world practice to determine the level of monopoly power of firms [17, 22]. Such a large number of indices and coefficients that characterise the level of market concentration, testifies to, on the one hand, the complexity of the object of research, and on the other hand, to the lack of

universal methodology that would solve the problem. This circumstance is the reason why economists continue developing new indexes or modifying the old ones [17].

The market shares variance index evaluates the degree of deviation of the market share of each developer from the average market share. The dispersion of market shares is calculated as [15]:

$$s^2 = \frac{1}{n} \sum_{i=1}^n \left( S_i - \frac{1}{n} \right)^2, \quad (11)$$

where  $S_i$  is the share of the  $i$ -th firm,  $n$  is the total number of firms in the market.

The smaller the dispersion of market shares  $s^2$ , the more homogeneous is the size of enterprises (firms) as well as the share of economic entities in the market, the lower the level of concentration. Conversely, the greater the size of the variance, the more unequal the market, the less is the competition and the stronger the power of large enterprises in it [9, 15]. The value of the index HHI is related to the dispersion of the firm's shares in the market as:

$$HHI = ns^2 + 1/n. \quad (12)$$

To determine the degree of uneven distribution of market shares among market participants, the coefficient of variation is also used:

$$v = \frac{S}{\bar{S}} \cdot 100\%. \quad (13)$$

Here  $\bar{S} = \frac{1}{n}$  is the average market share.

Table 3.5 presents the scale for determining the degree of homogeneity of the dataset, depending on the values of the coefficient of variation. The higher the uneven distribution of market shares, the more concentrated is the market under equal conditions. The magnitude of the coefficient of variation indicates the intensity of the variational feature and, accordingly, the homogeneity of the dataset under study. The increase in the coefficient of variation testifies that the feature oscillates around the mean, and that the more significant is the heterogeneity of the dataset.

**Table 4**  
**Scale for determining homogeneity of the dataset**

V	Degree of homogeneity of the dataset
Up to 30%	Homogeneous
30% - 70%	Average
70% and higher	Uneven

\* Compiled by the author, K. Pavlov, based on: [6].

Another indicator of the degree of uneven distribution of market shares is the *entropy index* showing the mean logarithm value of the share which is inverse to the market share, and is weighed by the market shares of firms:

$$E = \sum_{i=1}^n S_i \ln \left( \frac{1}{S_i} \right). \quad (14)$$

The entropy coefficient is a converse indicator of concentration: the higher its value, the lower the concentration of sellers in the market, thus, their lower ability to influence the market price [7]. If the value of the entropy index ranges from 0 to 0.5, this means that the market is monopolised or close to single monopolisation. If the value of the entropy index ranges from 0.5 to 2.0, it is an oligopolistic market. If the index value exceeds 2.0, this indicates a high level of competition in this market.

The Lorentz curve is a traditional tool for measuring the degree of inequality in income or wealth distribution of a population. This tool has begun to be used of late to assess the degree of concentration of different markets. The Lorentz curve shows which part of the total output is accounted for by a certain proportion of enterprises, which are dispersed in different groups depending on the size of the income.

The Gini G coefficient is a quantitative interpretation of the Lorentz curve, which reflects the

distribution of the total amount of income of the population (firms) between its individual groups. Its value can fluctuate within the range of 0-1. A Gini coefficient approaching to zero expresses even income distribution. The higher the level of the indicator value, that is, the more it approximates to 1, the more uneven is the distributed income in the market among the society.

The central idea to be the basis of the Gini coefficient presupposes that the calculation is made using the Lorentz curve; and that extreme positions in the distribution of wealth or income between individual groups of individuals are egalitarian. To put it differently, everyone who takes part in the distribution process receives equal shares, whereas in anti-egalitarian way, one participant in the distribution process gets all the benefits. In the first case, the complete equality is observed, and in the second case, there is the absolute inequality in the distribution process.

The calculation of the Gini coefficient is based on the data on the distribution of households (firms) depending on the average household income (firm). To depict the Lorentz curve on the coordinate axes with percentiles of 0 to 100, cumulative (accumulated) results of allocations are portioned: on the horizontal axis is the quantile of the persons receiving income, on the vertical, is quantile of the received income [14].

For an even distribution of incomes, each group of people (firm) would have the same share of income. In the graph, this is depicted by the diagonal of the square and is a line of even distribution, the perfect equality line (Fig. 1). For uneven distribution, the "concentration line" is a curve with a dip. The more significant is the deviation of the Lorentz curve from the straight diagonal of the square, the more evenly distributed is the income in the market among the society.

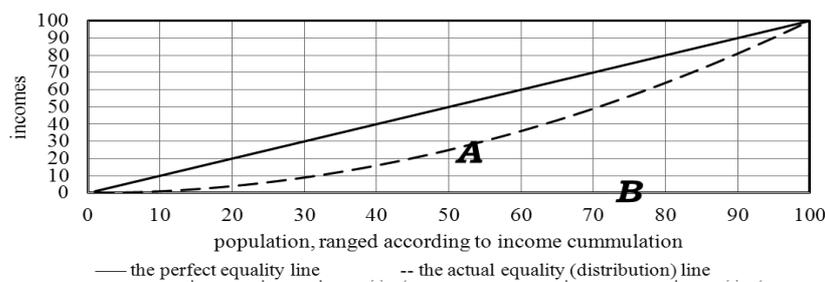


Fig. 1. The Lorentz curve (dashed line)

\* Built by the author K. Pavlov

The Gini coefficient helps to determine the average income difference between two recipients. Similarly, provided that the Gini coefficient is equal to 0.2, this would mean that the average difference in the income of recipients belonging to this population would be 40% as regards the average income of the population. In developed countries the Gini coefficient is 0.25–0.35, in the underdeveloped ones it is 0.70–0.80.

The Gini coefficient is the ratio of the area of the segment A created by the Lorentz curve and the perfect equality line to the area of the below positioned triangle A + B:  $G = A / (A + B)$ . For example, if the area of the curvilinear segment A is 12,000 units, the Gini coefficient is  $G = 12,000 / 50,000 = 0.24$ . Here  $A + B = 50,000$  is the area of the lower triangle, which is half the square. The approximate trapezoidal method can be used to calculate the area of the lower segment B [491].

$$B = \frac{h}{3}(S_0 + 4S_1 + 2S_2 + 4S_3 + \dots + 4S_{n-1} + S_n) \quad (15)$$

Where  $S_i$  - and  $i$  is the ordinate value of the Lorentz curve. The number of  $n$  values must be even. The area of the A segment is calculated by the ratio:

$$A = \frac{1}{2} - B \quad (16)$$

### Conclusions

Thus, in this article a number of methodological approaches to assessing the level of competition in the regional markets of residential real estate have been studied, systematised and suggested by the author, such as the methods of constructing integral indices of the construction market; as well as methodological approaches to determining the monopolisation level of residential real estate regional markets: the index of market concentration; the Linda Index; the Herfindahl-Hirschman Index; the Lerner indicator of monopoly power; the dispersion indicator; the entropy index; the Lorentz curve.

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## CONTROL OVER THE IMPLEMENTATION OF THE INNOVATIVE DEVELOPMENT PROGRAM AND EVALUATION OF ITS EFFICIENCY

**Abstract.** The peculiarities of control over the implementation of the innovative development program are analyzed. The use of means of indicative control based on the evaluation of the analysis results of both individual indicators and their groups (time, resource and result) in the process of current control over the emergence of deviations and their prompt correction during the implementation of the innovative development program is scientifically substantiated. General principles of the financial efficiency evaluation of the implemented innovative programs are researched. The analysis procedure of financial efficiency of the innovative development program of the enterprise is suggested, which is based on the assumption that a highly effective innovative program should provide improvement of the financial condition of the enterprise and is carried out in several successive steps: the choice of nomenclature of indicators used for the analysis of the financial condition; formation of the reported data on the results of the implementation of the innovative program; direct carrying out of analytical works; generalization of the results of the analysis. The development method of adjusted forms of financial reporting, based on the business operations of the enterprise and connected with an exclusively innovative activity, is suggested. The problem analysis enables to determine the impact of the implementation results of the innovative development program of the enterprise on the indicators of the financial condition, in contrast to the impact of factors associated with a non-innovative activity, in particular, operating or financial.

**Keywords:** innovative program, control, indicator, financial efficiency, evaluation, reporting, financial indicator

### Formulation of the problem

The growth of the role of innovation in the current conditions of entrepreneurship necessitates

a complete and objective evaluation of the financial efficiency of the implemented innovative programs, which plays an important role in the process of managing the innovative activity of the enterprise. The methodological tools for evaluating the financial efficiency of innovative development programs developed by Ukrainian and foreign scientists often duplicate methodological approaches for evaluating the investment projects. However, most of them are not suitable for evaluating the financial efficiency since they do not provide tools for analyzing the system of financial and economic indicators of the enterprise. Therefore, there is a need to develop a methodology for analyzing the financial efficiency of the innovative development program of the enterprise, which would fully ensure the objective results of such analysis.

### Analysis of recent research and publications

The issues of the methodology and practice of evaluating the efficiency of the innovative program at the enterprise are examined in the works of many Ukrainian and foreign scientists. A significant contribution to the development of science in this direction is made by O.A. Gavrysh, S. I. Hrytsulenko, O.E. Kuzmin, S.V. Kniaz, E.A. Lyfanova, Yo. M. Petrovych, O.V. Tytova, R. N. Fedosova, A.V. Cherep, N.I. Chukhrai, E.S. Shynkareva, N.V. Shyriayeva and others. Methodological and organizational issues for evaluating the efficiency of the innovative programs are the subject of the thesis research of such Ukrainian scientists as Ye.V. Hnitsky, K. M. Kashchuk, N.P. Krush, A.E. Nykyforov, K.S.

Savenko, E.E. Savytsky, D.I. Skvortsov, I. A. Shaiko and others.

Despite the considerable amount of research, the issue of a complete and objective evaluation of the financial efficiency of the implemented innovative program requires further research. The issue of the determination of the financial effect from the implementation of an innovative development program at the enterprise remains unsettled not taking into account the influence of factors related to non-innovative activity, in particular, operational or financial.

**The aim of the article** is to develop a methodology for analyzing the financial efficiency of the innovative development program of the enterprise, which would fully ensure the objective results of such an analysis.

**Presentation of the main material**

Control is an important factor in the efficient management of innovative activities at the enterprise, as well as a means to achieve the established strategic goals of innovative development and related tasks. The implementation of any innovative program without an efficient organization of the control system is foredoomed to failure

In our opinion, one of the efficient methods of current control over the emergence of deviations and their prompt correction during the implementation of the innovative program is the use of the indicative monitoring mechanism.

Recent research demonstrates the efficiency of the use of indicators (as opposed to well-

defined, rigid policy indicators) in different areas of management, mainly in macro level planning. M. R. Tymoshchuk [1, p. 304] defines indicative planning as a formation process of a system of indicators that characterize the condition and development of the country's economy and correspond to the state social and economic policy, as well as the development of measures of state influence on social and economic processes in order to achieve the defined indicators. Indicative planning is fundamentally different from policy planning by achieving the goals set in the plan. Its indicators do not have the status of mandatory tasks for certain economic entities, but they are of an advisory and preliminary nature [2, p. 01]. According to M. N. Bidniak [3, p. 31], the control system of indicative management evaluation includes the evaluation of indicative forecast indicators, indicative planning indicators and program indicators.

The method of indicative control consists in the development of a number of indicators of the process under control, i.e. indicative features, the change of which indicates a high possibility of a negative result of the program implementation. The use of indicators enables to evaluate the current condition of the innovative development program implementation of the machine-building enterprise and to identify “bottlenecks” and problem areas of the program's projects. Control involves using the questionnaire as a basic tool in the process of checking the current status of the program to evaluate the admissibility of any violations detected, as well as providing certain recommendations for its results (Fig. 1).

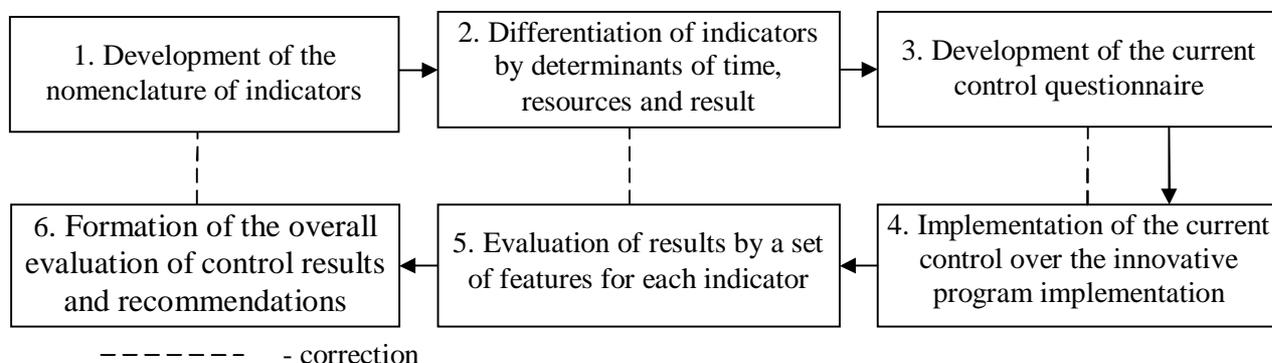


Fig. 1. Mechanism of the current indicative control implementation of the innovative development program of the enterprise

Source: elaborated by the author

The implementation of the mechanism controlling the innovative development program of the enterprise is to be implemented in six stages: the development of indicators; division of indicators into three groups (time indicators, resource indicators, result indicators); development of the working questionnaire of the controller; direct implementation of control measures and procedures; evaluation of the results of the current control in the context of individual indicators and groups of indicators; preparation of the report and formation of recommendations on the control results.

The control over the implementation of the innovative program takes place according to three main determinants (generalized indicators) of time, resources and result. The division of indicators takes place taking into account the peculiarities of the enterprises of the machine-building industry and critical areas of work on the implementation of the innovative development program.

A generalized indicator of time is a system of features that enables to evaluate the possibility of violating the time of the implementation of the innovative development program. This term is a certain period of time that begins on the next calendar day after the approved date of the project implementation and ends with the scheduled date for its completion.

A generalized indicator of resources is a system of features indicating possible violations of the volumes and quality of the objects of the natural, economic and social environments that are involved in meeting the needs of the enterprise's innovative development. These include financial, material and human resources involved in the implementation of the innovative development program.

A generalized indicator of the result is a system of features that enables to evaluate the possible negative effect of the innovative program implementation. It is closely linked to the abovementioned indicators, but the separation of this category is intended to demonstrate the possibility of obtaining a negative result, even if the rules of time and resources are respected.

The final conclusion in the case of indicative control use over the implementation of the innovative program of the machine-building

enterprise can be made only after a detailed analysis of the characteristics (properties) of the detected indicators. The most important properties are the following: systematicity, duration and redundancy.

Systematicity involves repeated and repetitive violations, which results in an increase in the timing of project implementation, in excess of the volume of resources used and/or in the formation of a negative result at individual stages of the project implementation or on the program as a whole. Systematicity may indicate the inactivity of management in addressing the pressing problems of innovation development of the enterprise.

Duration is the time during which there is a violation. We proceed from the assumption that the longer the duration of the negative factors on the resulting feature is, the more harmful the effects of the impact and, consequently, more labour-intensive and costly work to correct such influence is. Duration can indicate a lack of proper tools for identifying and correcting problems in the innovative program implementation.

Redundancy is the amount of extra (excess) spent resources and time per unit of performed work, which ultimately affects the efforts to be made to correct existing problems. Capacity indicates the inefficiency of using the risk diversification mechanism in relation to certain aspects of an enterprise's innovative development program: dependence on one source of financing, supplier, contractor, employee-innovator, etc.

Each of the available time, resource and result indicators to evaluate the possibility of achieving a positive final result of the innovative development program implementation should be checked for the presence of deviations according to the criteria of systematicity, duration and redundancy.

The solution of the problem is based on the use of qualitative criteria and methods for their processing (for example, using fuzzy logic methods).

The efficiency of the innovative development program is testified by an excess of the effect of spent resources obtained from its implementation. For innovative projects, the effect can be economic, social, environmental, etc.

The economic effect obtained in the use of scientific and technical products can be manifested in the growth of labour productivity, increase in the operating time of equipment, reduction of operating costs, cost of production, the capital cost per unit of output of products, increase of its quality, enlargement in the share and profit margins, as well as the improvement of social indicators compared to the available option. The economic effect from the introduction of scientific achievements into production is the material basis of the existence and development of the science itself [4, p. 103].

N.V. Shyriayeva and O. B. Bilotserkivsky distinguish the following types of efficiency: budget; economic; social; technical; technological; investment; and ecological [5, p. 74-75]. The abovementioned categories, A.V. Cherep and Ye. M. Strilets complement with the legal, innovative and the efficiency of integration of insurance enterprises with banks [6]. In addition to economic efficiency, the researchers often highlight financial or commercial efficiency, which is designed to differentiate the interests of investors, owners and the state in the implementation of the innovative development program. Such a division is considered to be justified, since an innovative program that is successful from the point of view of some interested persons, can be considered unsuccessful by others.

Economic efficiency reflects the impact of the innovative project on the society as a whole. Indicators of profit(income) or savings are manifested at various levels of society: ranging from individuals to large enterprises and the state. Commercial (financial) efficiency takes into account the financial implications of project implementation for its direct participants - investors. The project's budget efficiency reflects the financial implications of project implementation for state and local budgets [7, p. 79].

Financial efficiency characterizes the efficiency of innovative activities aimed at improving the financial condition of the enterprise. The importance of distinguishing this category is determined by the fact that one of the most important tasks of the innovative program implementation is to ensure sustainable

development of the enterprise on the basis of creating conditions for improving the financial and property status.

For evaluating the efficiency of an innovative program, the following methods commonly used in the investment project analysis are used:

- statistical: by return on investment (ROI), payback period (PP), an average rate of return (ARR), etc.;

- dynamic (discounted): by net present value (NPV), by profitability index (PI), by internal rate of return (IRR), by discounted payback period, DPP) etc.;

- real options methods: the Black-Scholes Option Pricing Model, the Cox-Ross-Rubinstein Binomial Options Pricing Model, and others.

The advantages and disadvantages of using these methods can be found in the works of Ukrainian and foreign researchers.

The scientists point out that they are not fully suited to assess the efficiency of innovation. This is due to the fact that the creation and use of innovations, as opposed to the investment project, usually involves a wide range of participants. The enterprise itself is mainly interested in the implementation of the investment project, as well as the investors financing it. In the innovative process, especially in the process of implementing a large innovative project, investors, research, development and project organizations, factories producing new products and consumers can be involved [8, p. 130]. Most of them are not suitable for the evaluation of financial efficiency since they do not provide tools for analyzing the system of financial and economic indicators of the enterprise activity.

The methodology for analyzing the financial effectiveness of the innovative development program of the enterprise, which is based on the assumption that a highly effective innovative program should ensure the improvement of the financial condition of the enterprise, is offered.

The implementation of the methodology is carried out in several successive stages:

- 1) selection of the indicators used to analyze the financial condition of the enterprise in six basic directions: analysis of the property status, profitability analysis, analysis of liquidity and

solvency, analysis of financial stability, feasibility analysis, and business activity analysis. All indicators are divided into indicators-stimulants (growth indicates improvement in financial condition) and disinfectants (growth indicates a deterioration in the financial condition);

2) formation of the reporting data on the results of the innovative program implementation to determine the impact of an innovative activity on the financial condition of the enterprise;

3) conduction of analytical work, the result of which is the formation of an analytical map for determining the financial and economic efficiency of the innovative development program of the enterprise;

4) generalization of the results of the analysis, determination of the efficiency of the innovative development program and the formulation of proposals.

Stage 1. For the proposed methodology, 38 known indicators of the analysis of the financial condition, divided into 6 groups, are used:

1) indicators of the property status evaluation (the research of the use of non-current assets and their sources of formation): the coefficient of depreciation of fixed assets, coefficient of renewal of fixed assets, coefficient of fixed assets retirement, proportion of the active part of fixed assets;

2) indicators of profitability evaluation (the research of the activity efficiency by studying the ratio of profits/income and resources spent for their obtaining): the profitability of investment in ordinary shares, total profitability, the profitability of assets, rotation of non-current assets;

3) indicators of liquidity and solvency evaluation (the research of the adequacy of current assets for the settlement of current liabilities): the cash maneuverability, total coverage ratio, intermediate coefficient of coverage, absolute liquidity ratio, share of working capital in assets, share of inventories in current assets, share of own working capital in the coverage of stocks, coefficient of critical evaluation, rotation of stocks;

4) indicators of financial sustainability evaluation (the research of the possibilities of self-financing and independence of the enterprise from external sources): the autonomy coefficient, debt and equity ratio, long-term ratio of capital

employed, coefficient of maneuverability of own capital, coefficient of real value of fixed assets in assets, coefficient of financial dependence, coefficient of concentration of attracted capital, coefficient of structure of attracted capital;

5) indicators of profitability evaluation (the research of the level of return on costs, capital, resources): the profitability of sales, profitability of operational activity, return on equity capital, a period of return on equity, the profitability of fixed capital;

6) indicators of business activity evaluation (the research of turnover of assets and liabilities of the enterprise): the coefficient of total turnover of assets, turnover rate of mobile means, turnover rate of stocks, turnover rate of finished products, turnover rate of accounts receivable, average duration of turnover of accounts receivable, turnover rate of accounts payable, average duration of trade payables, capital productivity ratio of non-current assets, turnover rate of own capital.

In general, the selection of indicators depends on the detailed aim of the analysis. For example, if an analyst has doubts about the positive effect of innovative activity on the liquidity of the investigated enterprise, he may focus on the external analysis of solvency indicators for reporting periods.

The need for a comprehensive study of the abovementioned indicators is dictated by the fact that the positive impact of the results of the innovative program on one indicator may be cancelled out by a negative one - for others. For example, the improvement of property status by putting into operation of the latest non-current assets may be due to a deterioration of liquidity, since the funds, previously deduced from the business turnover of the enterprise, were spent on the development.

Stage 2. To determine the magnitude of the impact on the indicators of the financial condition analysis of the implementation results of the innovative development program of the enterprise, it should be taken into account that the change in the indicators in the period of program implementation occurs, including due to the impact of factors related to non-innovative activity (in particular, operational or financial). To solve this issue, we propose to develop an adjusted form of

the Balance Sheet (Financial Condition Report) and the Income Statement (Statement of Total Income), which will be made on the basis of business operations of the enterprise directly related exclusively to the innovative activity. The implementation of this process in the accounting system will take place using the system of analytical subaccounts set up to the envisaged Schedule of Accounts. To simplify it, automated processing of accounting data can be used. As a result, forms of financial reporting will be received, formed on the results of the implementation of innovative projects that are a part of the innovative development program. The structure of the innovative Balance Sheet (Financial Condition Report) and the Income Statement (Statement of Total Income) do not differ from those adopted in the accounting practice and approved by the norms of the National Accounting Standard (Standard) 1 "General Requirements to the Financial Statements", but in content they will contain data on assets, liabilities, capital, income, expenses, financial results and total income from innovative activities for the reporting period. It is appropriate to choose a quarter for such a period for the possibility of reconciliation and adjustment with indicators in the articles of usual financial statements. The starting date for the compilation of reports will be the date of the start of the innovative

program implementation, and the final date is the completion of the innovative program.

In the balance sheet, by the results of innovative activities the assets, accumulated as a result of such activities, liabilities associated with it, as well as the portion of the capital of the enterprise used for its financing, are reflected.

The Adjusted Income Statement(Statement of Total Income) contains information on the income and expenses associated with the innovative activity of the enterprise.

Both reporting forms are used exclusively for the internal needs of the enterprise and are useful in the case of analysis of the impact of the results of the innovative program implementation on the financial condition of the research object.

Stage 3. To determine the impact of indicators on the financial condition of the enterprise, a number of actions related to the calculation of the following should be carried out: a basic financial indicator based on the results of economic activity (is used as a result in the analysis of the impact of other indicators); the discounted financial indicators on the results of innovation and other (except innovative) activity (is used to determine the range of changes in indicators of innovative activity); the basic financial indicator on the results of innovative activity (is used as a factor of influence on the result indicator) (Fig. 2).

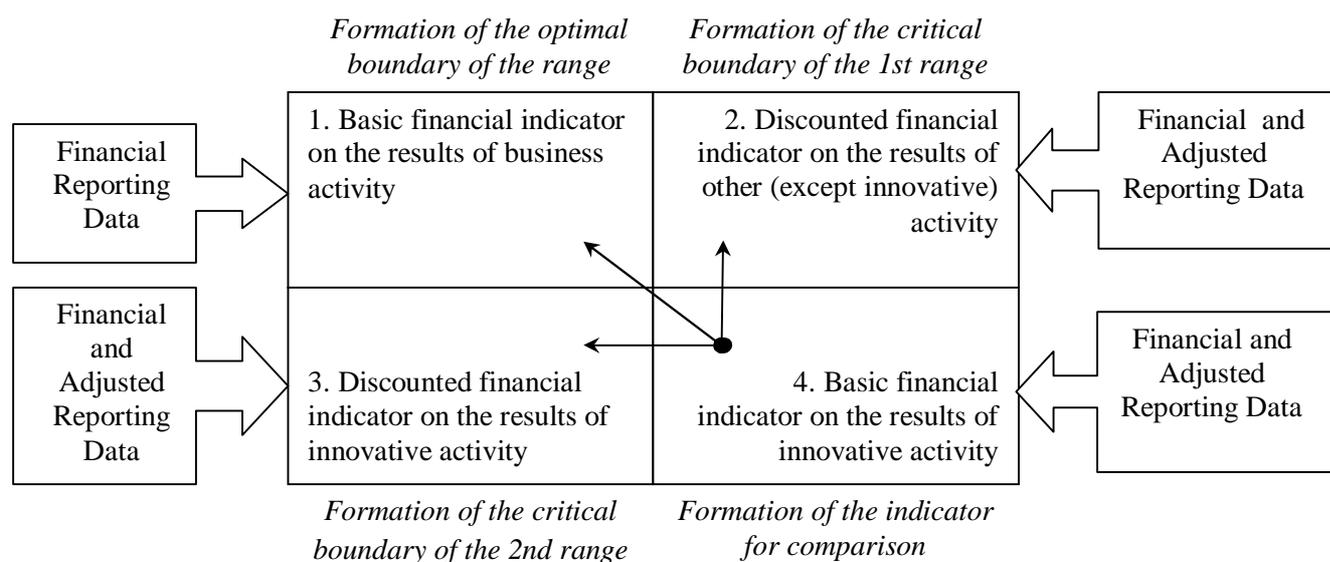


Fig.2 Principal scheme of the formation of comparable values of indicators, calculated on the basis of financial and adjusted reporting

Source: author's idea

The basic financial indicator is calculated on the basis of Balance Sheet (Financial Condition Report) and the Income Statement (Statement of Total Income), as well as additional analytical data, and is used to form the boundary value that can be considered as the basis for comparing the same indicator, calculated on the basis of the reporting made up of the effects of innovation.

The sum of the discounted financial indicator on the results of other (except innovative) activity and the discounted financial indicator on the results of innovative activity is equal to the basic financial indicator on the results of economic activity.

The numerical value of the basic financial indicator on the results of innovative activity can be found in one of the four ranges:

- range 1: the higher value of the basic financial indicator on the results of economic activity;

- range 2: the higher value of one of the discounted financial indicators, but the lower value of the basic financial indicator on the results of economic activity;

- range 3: between the values of the discounted financial indicators;

- range 4: the lower value of one of the discounted financial indicators on the results of economic activity. It may be both a discounted financial indicator, calculated on the basis of the impact of the innovative activity on the results and similar, calculated on the basis of the impact of another (operational, financial) activity on the results.

Stage 4. The mutual impact of the results of innovative and other activities on the financial condition of the enterprise can be as follows:

1) complementary positive - the positive impact of the results in both types of activities;

2) reverse with the positive impact of innovative activity;

3) reverse with the positive impact of the results of other activities;

4) complementary negative - the negative impact of the results in both types of activity.

For maximizing the efficiency of management options following the results of the

analysis of the financial and economic efficiency of the innovative development program, the evaluation of projects is carried out after each stage of implementation.

### **Conclusions and perspectives for further research**

Thus, the proposed method of evaluating the financial component of the efficiency of the innovative development program of an enterprise enables to determine the impact of the results of the innovative program on the financial condition of the enterprise by eliminating the impact of other factors related to operational and financial activities. Prospects for further research are to develop a methodology for monitoring the implementation process of the innovative development program of an enterprise.

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## DEVELOPMENT OF MODEL F INTEGRAL FIRE RISK MANAGEMENT BY CORRELATION-REGISTRATION ANALYSIS

**Abstract.** This work is devoted to the construction of a mathematical model for controlling integral fire risk using correlation-regression analysis. On the basis of previous work, work is ongoing on developing a risk management method. For this purpose, the second cluster, which includes the Kharkiv region, was analyzed. In the field of initial data, included statistics for 2010-2017 on parameters such as the number of victims of fire in a year, the time of flight of fire and rescue units to the place of fire, the time of their localization of fire, the time of elimination of the fire and the number of people living in the study area. Using statistical data, the risk of death from a fire in a year was mathematically calculated and entered into the field of output data as a parameter to be investigated.

The study cluster includes 9 areas, therefore 63 events were received and analyzed. As a result, a regression equation was obtained, which makes it possible to predict a risk with a 95% confidence. For example, the Kharkiv region conducted a forecast of the corresponding risk, with the actual result close to the forecasted, and lies within the permissible limits with a deviation of 5%, which indicates the reliability of the developed mathematical model.

**Key words:** risk, correlation-regression analysis, factor, mathematical model, model adequacy.

### The problem statement

The level of fire risk in our time is a normalized value, the value of which must be within acceptable limits. In accordance with the Concept of Risk Management for Man-made and Natural Emergencies [1] in Ukraine the value of

the relevant risk should not exceed the value of  $10^{-5}$ . This approach is in line with the practice applied in economically developed countries of the world. At the same time, the value of the calculated integral fire risk in all regions of Ukraine exceeds the permissible level. In this regard, there is a scientific and applied problem, which consists in reducing the specified level of risk to the admissible, that is, justified in the given socio-economic conditions. One of the tasks that will contribute to solving the problem is to identify the parameters that affect the integral fire risk, to develop models and methods of risk management, to predict the level of risk for the further development of substantiated recommendations regarding the establishment of security centers in the most problematic regions of our country.

### The relevance of the chosen topic

In this paper we consider the process of constructing a model of management of integral fire risk  $R_{\Sigma}$ , namely the risk for a person to perish in a fire per unit time (in our case, per year), as well as forecasting this risk. In accordance with the Constitution of Ukraine [2], the fundamental right of every person is the right to life and the duty of the state is to protect human life. It should be noted that the specified risk characterizes the consequences of dangerous events, including fires. But at present, there are no models and methods for

managing this type of risk, which indicates the relevance of this work.

### An analysis of recent research and publications

In the previous articles, the foreign experience of the state regulation of acceptable risk level was analyzed [3] (this article contains the principles of risk regulation), the analysis of the main integral fire risks in the territory of Ukraine [4] was carried out, and the administrative-territorial units of Ukraine with high level of risk data were identified. In work [5] an estimation of the parameters influencing the integral fire risk is conducted. From this paper we can conclude that the investigated risk is directly proportional to the number of deaths from the fire, and has a significant dependence on the time of the fire and rescue units arrival and the time of fire localization.

### Purpose and objectives

The purpose of this work is to develop a mathematical model of integral fire risk management, which will reflect the dependence of this risk on the parameters studied. To achieve the goal, it is necessary to conduct correlation-regression analysis with obtaining the coefficients of the corresponding function.

### The main material of the research and the results obtained

One of the main directions of ensuring fire and technological safety in Ukraine is the introduction of a risk-oriented approach. One of the objectives of the risk-oriented approach is to develop the scientific basis of the concept of acceptable risk regarding the conditions of functioning of the national economy.

A risk-based approach [6] is a set of organizational measures that involves monitoring, analyzing, and assessing the risk of any entity based on a probabilistic safety analysis to prevent emergencies and manage risk in general. The transition to analysis and risk management should not only help to overcome the negative tendency to the increase of the number of emergencies, but also minimize their negative consequences: human losses, financial losses and environmental damage.

In order to manage risk it is necessary to find management levers that can be further influenced. We will conduct a correlation-regression analysis to find the necessary levers. Regression analysis is a method of studying the statistical relationship between one quantitative dependent variable and one or more independent quantitative variables. The dependent variable in the regression analysis is called the resulting, and the variable factors are the explanatory variables. In our case, the resulting variable is the integral fire risk  $R_3$ , and the explanatory variables are the number of victims  $N_{victims}$ , the time the fire and rescue units traveled to the place of fires  $N_{arrive}$ , the time of their localization  $T_{loc}$ , the time of the fire and the number of people living in the studied area  $T_{liq}$ .

Using the STATISTICA program, a correlation-regression analysis of the four clusters, as defined in the previous work [7], was performed. Using the Kharkiv region as an example, we will show the results of the calculations. Since the Kharkiv region belongs to the second cluster, we analyze it in the article.

The first stage of regression is to obtain a correlation matrix (Fig. 1).

Correlations (2_En)							
Variable	$N_{fire}$	$N_{victims}$	$T_{arrive}$	$T_{loc}$	$T_{liq}$	$N_{popul}$	$R_3$
$N_{fire}$	1.000000	0.764915	0.031368	0.253070	0.013677	0.879360	0.060604
$N_{victims}$	0.764915	1.000000	0.088737	0.323689	-0.118355	0.937602	0.469821
$T_{arrive}$	0.031368	0.088737	1.000000	0.212499	0.575925	0.126764	-0.120900
$T_{loc}$	0.253070	0.323689	0.212499	1.000000	0.053396	0.235887	0.437409
$T_{liq}$	0.013677	-0.118355	0.575925	0.053396	1.000000	-0.024018	-0.272294
$N_{popul}$	0.879360	0.937602	0.126764	0.235887	-0.024018	1.000000	0.171210
$R_3$	0.060604	0.469821	-0.120900	0.437409	-0.272294	0.171210	1.000000

Fig. 1. Correlation matrix

The next step is to remove those parameters with which the risk has a strong correlation. In our case, there are no such parameters. A table with the values of significance was obtained (Fig. 2).

Regression Summary for Dependent Variable: $R_3$ (2_En)						
R= .92694742 R <sup>2</sup> = .85923152 Adjusted R <sup>2</sup> = .84414918						
F(6,56)=56.969 p<0.0000 Std.Error of estimate: .00000						
	b*	Std. Err. of b*	b	Std. Err. of b	t(56)	p-value
N=63						
Intercept			0.000058	0.000004	13.6670	0.000000
$N_{fire}$	0.20197	0.121943	0.000000	0.000000	1.6563	0.103257
$N_{victims}$	2.50990	0.175390	0.000000	0.000000	14.3104	0.000000
$T_{arrive}$	-0.08262	0.066501	-0.000001	0.000000	-1.2424	0.219264
$T_{loc}$	0.15390	0.058243	0.000000	0.000000	2.6423	0.010656
$T_{liq}$	0.00408	0.064797	0.000000	0.000000	0.0629	0.950075
$N_{popul}$	-2.38542	0.232631	-0.000000	0.000000	-10.2541	0.000000

Fig. 2. Levels of significance of the studied parameters

*Development of Model F Integral Fire Risk Management by Correlation-Registration Analysis*

The level of significance of the studied parameters in Fig. 2 is shown by the criterion of p-value, which should not exceed 0.05. In our case, there are three such parameters at this stage, so we start with removing the greatest p-value. By deleting the parameter for the liquidation time  $T_{liq}$ , we will obtain a new table with the significance levels (Fig. 3).

Regression Summary for Dependent Variable: $R_3(2\_En)$						
R= ,92694205 R <sup>2</sup> = ,85922157 Adjusted R <sup>2</sup> = ,84687259						
F(5,57)=69,578 p<0,0000 Std.Error of estimate: ,00000						
N=63	b*	Std. Err. of b*	b	Std. Err. of b	t(57)	p-value
Intercept			0,000058	0,000004	13,9459	0,000000
N <sub>fire</sub>	0,20289	0,120014	0,000000	0,000000	1,6905	0,096392
N <sub>victims</sub>	2,50774	0,170475	0,000000	0,000000	14,7103	0,000000
T <sub>arrive</sub>	-0,08021	0,053875	-0,000001	0,000000	-1,4888	0,142043
T <sub>loc</sub>	0,15388	0,057731	0,000000	0,000000	2,6654	0,009986
N <sub>popul</sub>	-2,38459	0,230221	-0,000000	0,000000	-10,3578	0,000000

Fig. 3. Levels of significance of the studied parameters without  $T_{liq}$

The number of considered cases being analyzed equals the accepted valid ones and is 63,

so it is not expedient to analyze again the matrix of correlations. In Fig. 3, we see that p-value of two more parameters is greater than 0.05, so we delete the arrival time  $T_{arrive}$  from the analysis and then again analyze the table with the levels of significance (Fig. 4).

Regression Summary for Dependent Variable: $R_3(2\_En)$						
R= ,92398428 R <sup>2</sup> = ,85374695 Adjusted R <sup>2</sup> = ,84366053						
F(4,58)=84,643 p<0,0000 Std.Error of estimate: ,00000						
N=63	b*	Std. Err. of b*	b	Std. Err. of b	t(58)	p-value
Intercept			0,0000535547565	0,000003	18,1675	0,000000
N <sub>fire</sub>	0,25374	0,116252	0,0000000012181	0,000000	2,1826	0,033125
N <sub>victims</sub>	2,57412	0,166258	0,0000005066851	0,000000	15,4827	0,000000
N <sub>popul</sub>	-2,49578	0,220044	-0,000000325992	0,000000	-11,3422	0,000000
T <sub>loc</sub>	0,12870	0,055775	0,000000367267	0,000000	2,3075	0,024615

Fig. 4. Levels of significance of the studied parameters without  $T_{liq}$  and  $T_{arrive}$

Since all significance values of the parameters are less than 0.05, we will now proceed to the analysis of the residuals. To start with, we will construct the histogram of the residuals (Fig. 5).

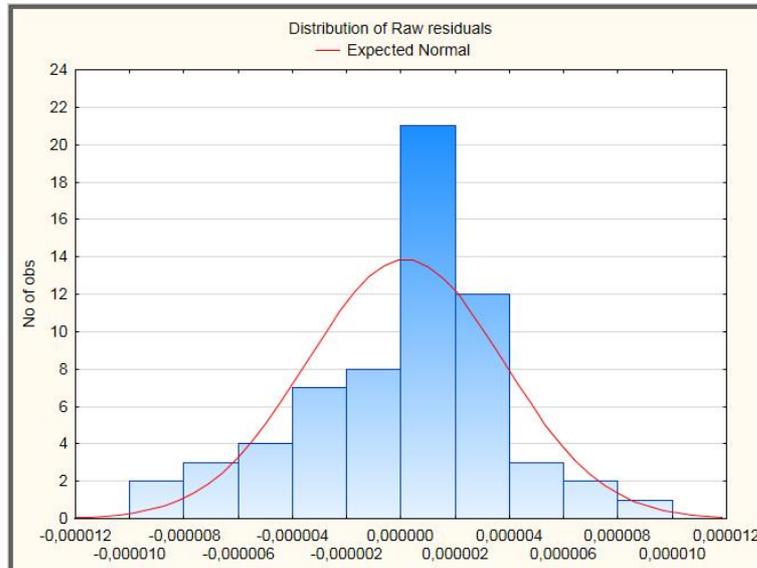


Fig.5. Histogram of residuals

Let us check the residuals for normality. In general, Fig. 5 demonstrates the normality of the distribution, although there is one peak that would be less noticeable with the increase in the number of intervals. The hypothesis does not deviate from normality. The next step is to construct a normal probability plot of residuals (Fig. 6).

The systematic deviations of the actual data from the theoretical normal line are not observed, that is, the residuals are distributed normally. Now let us check whether there is or there is no dependence of the residuals on the predicted values and residuals. For this purpose, let us construct a scatter diagram to evaluate the acceptability of the results (Fig. 7).

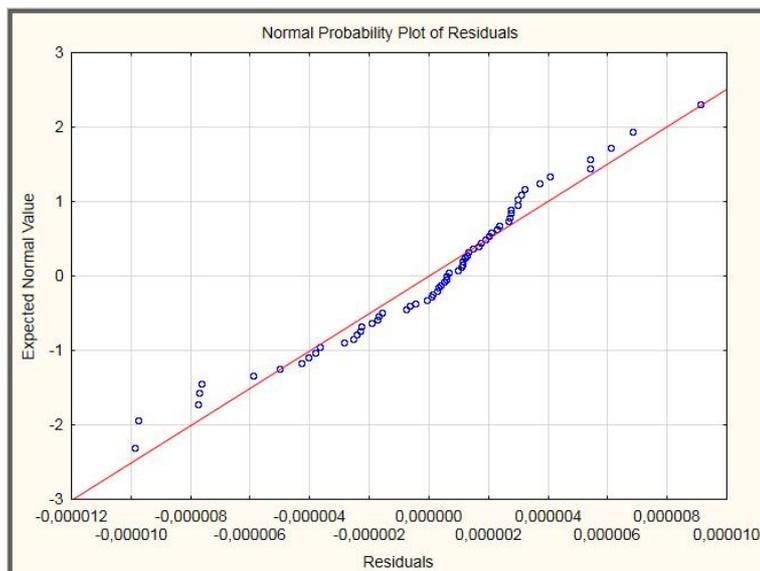


Fig. 6. Normal probability plot of residuals

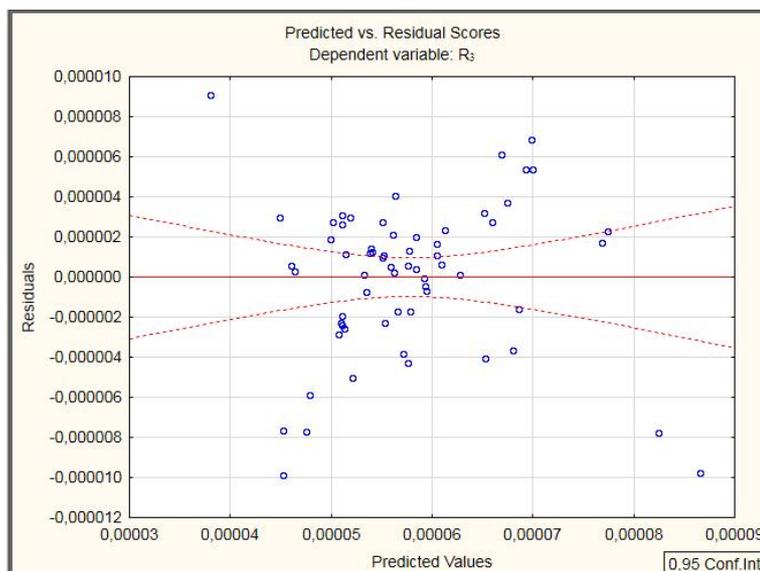


Fig. 7. The diagram of scattering the residuals from the predicted values

There is no consistency in the placement of points; they are located chaotically. Thus the residuals do not depend on the predicted values. Analysis of the residuals by two parameters indicates the adequacy of the model.

Let us move on to the stage of checking acceptability of the model as a whole. The level of significance must be between 0 and 0.05. From Figure 8, we determine that the level of significance is equal to 0. In this regard, the model can be considered acceptable.

The determination coefficient ( $R^2$ ) shows the adequacy of the selection of factors that influence

the risk. Since this coefficient is equal to 0.85374695 (Fig. 4), which is more than 0.3, the selection of factors is adequate. The fact that the determination coefficient is close to one testifies to the quality of the model.

Analysis of Variance; DV: $R_3$ (2_En)					
Effect	Sums of Squares	df	Mean Squares	F	p-value
Regress.	0,000000	4	0,000000	84,64323	0,000000
Residual	0,000000	58	0,000000		
Total	0,000000				

Fig. 8. Table of the results of dispersion analysis

*Development of Model F Integral Fire Risk Management by Correlation-Registration Analysis*

Let us write the linear regression equation in the general case:

$$Y = b_0 + b_1X_1 + b_2X_2 + \dots + b_kX_k \quad (1)$$

where  $Y$  is the dependent variable under study (factor, parameter), in our case it is  $R_3$ ;  $b_0, b_1,$

$$Y = 10^{-6} \cdot (53.5547 + 0.3677T_{loc} + 0.0012N_{fire} + 0.5067N_{victims} - 0.0326N_{popul}) \quad (2)$$

Let us now consider the risk prediction using the resulting model. Fig. 9 shows all the parameters needed to predict the value of risk. Let us make a forecast for 2017 according to the data for the Kharkiv region, which are already known. The initial data are as follows:  $N_{fire} = 6430$ ;  $N_{victims} = 135$  people;  $N_{popul} = 2718.5$  thousand people;  $T_{loc} = 17$  min.

Predicting Values for (2_En) variable: $R_3$			
Variable	b-Weight	Value	b-Weight * Value
$N_{victims}$	0,000001	135,000	0,000068
$N_{fire}$	0,000000	6430,000	0,000008
$T_{loc}$	0,000000	17,000	0,000006
$N_{popul}$	-0,000000	2718,500	-0,000089
Intercept			0,000054
Predicted			0,000047
-95,0%CL			0,000045
+95,0%CL			0,000050

Fig. 9 Risk forecast for 2017 made with the help of the developed model

Let us calculate the integral fire risk using the following expression [4]:

$$R_3 = \frac{N_{victims}}{N_{popul}} \quad (3)$$

$$R_3 = \frac{135}{2718.5} = 0.00004966 \frac{1}{year} \quad (4)$$

If we compare the values calculated by formula (3) with the predicted ones, then we can see that the actual result is close to the forecasted and lies within the permissible limits with a deviation of 5%. This testifies to the reliability of the obtained mathematical model.

**Conclusions**

The paper presents a mathematical model of integral fire risk management constructed using a

$b_2 \dots, b_k$  are estimation of the parameters of the regression equation;  $X_1, X_2, \dots, X_k$  are explanatory variables.

Let us write the equation of the received regression:

correlation-regression analysis. Having taken the Kharkiv region as an example there was made a forecast of the corresponding risk. The actual result turned out to be close to the forecasted one and was within the permissible limits with a deviation of 5%, which indicates the reliability of the developed mathematical model. Further research will be aimed at developing a risk management method and working out well-founded recommendations for the establishment of security centers in the most problem regions of Ukraine.

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